ELECTRICAL WEST

June 1948
25 cents

16th Annual Convention-In-Print

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

EDISON CUSTOMERS ARE IN THE MARKET FOR $25,000,000 WORTH OF *Ranges* AND *Water Heaters* AND THEY MEAN BUSINESS

Edison territory has been growing at the rate of 5,000 new homes every month since V-J Day. Together with replacement figures of 40,000 ranges and 60,000 water heaters annually, that adds up to a tremendous market waiting to be tapped by Southern California appliance dealers.

These customers have had a long wait. They have been watching Edison advertising for the signal that electric ranges and water heaters are available. And now that dealer stocks are adequate, Edison will spread the welcome news.

It's the biggest opportunity you've had in years to cash in with big sales—big profits. Remember "Edison tells them, and the dealer sells them!"

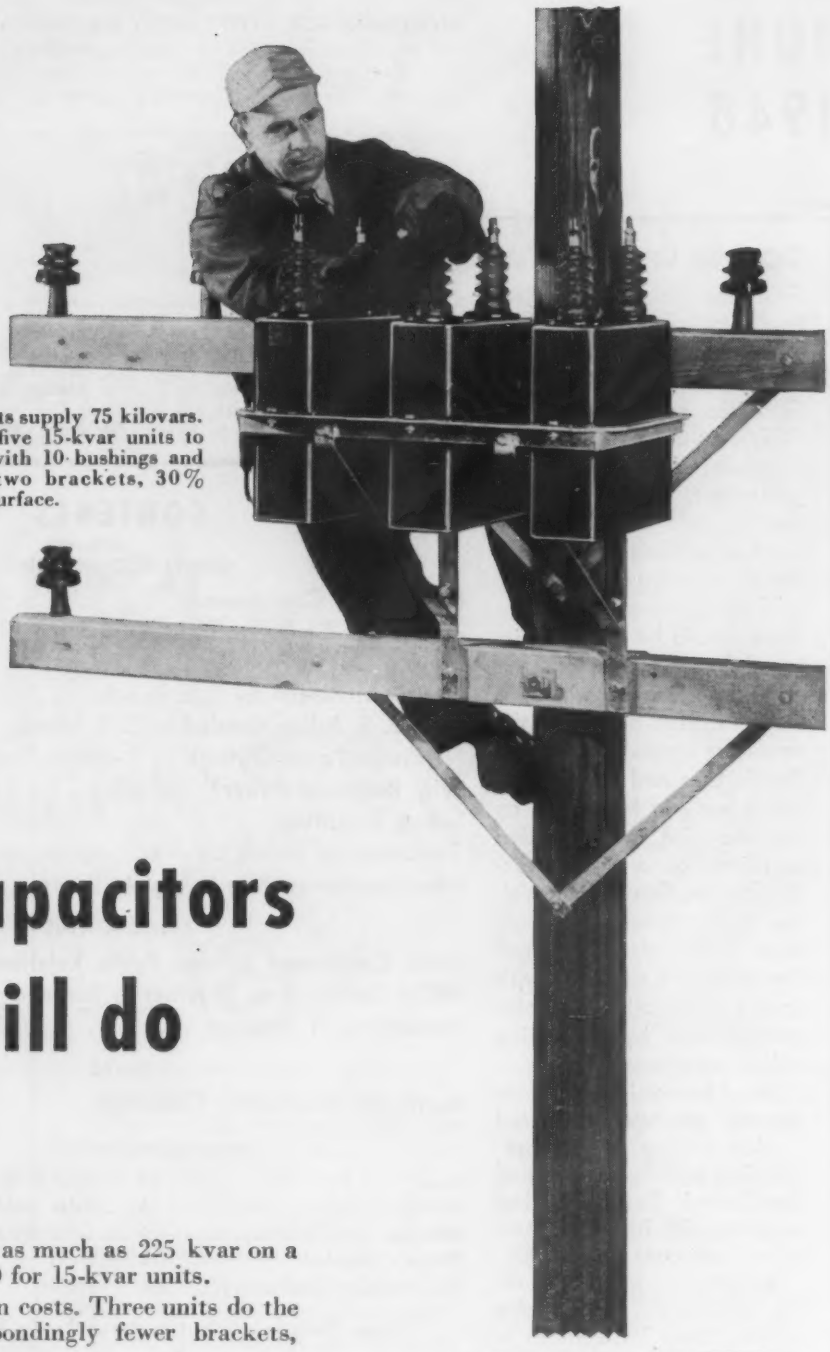
DO YOUR PART—GET YOUR SHARE

to build Sales for **YOU**: *Range and Water Heater Campaign begins June 1st*

- **Newspaper ads**
- **Magazine ads**
- **Window and store displays**
- **Merchandise tags**
- **Direct Mail**
- **Sales Manuals**

See Dealers News or your Edison office for details

SOUTHERN CALIFORNIA EDISON COMPANY



These three units supply 75 kilovars. It would take five 15-kvar units to equal them—with 10 bushings and connections, two brackets, 30% more exposed surface.

why use 5 capacitors when 3 will do ?

25-kvar capacitors permit installation of as much as 225 kvar on a single pair of crossarms—compared to 180 for 15-kvar units.

25-kvar capacitors mean lower installation costs. Three units do the job of five 15-kvar units—with correspondingly fewer brackets, bushings, connections.

25-kvar capacitors have glass bushings hermetically sealed to the resistance-welded drawn-steel cases, Pyranol*, and other G-E features that mean maximum dependability.

25-kvar capacitors are stock items available for immediate shipment. A General Electric specialist can give you full information. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

*Reg. U. S. Pat. Off.

ALREADY...

Over 150,000 kvar of 25-kvar capacitors have been ordered by some 25 electric utilities in 20 states.

GENERAL ELECTRIC

407-127

JUNE
1948

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal", "Journal of Electricity, Power and Gas" and "Journal of Electricity". Contents Copyright. Sixty-first year of publication.

ELECTRICAL WEST

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COMING UP

Following this Convention-In-Print issue, next month will have a comprehensive account of the bang-up San Francisco convention of the PCEA. With the usual full programs of the Business Development, Operating Economics, and Administrative Services sections supplementing nine luminaries who will address the general sessions, there should be plenty of interest for all in the industry.

Also coming up will be a well-illustrated story on the new Kern steam plant of the Pacific Gas and Electric Co. which early in May went on the line with much needed additional generating capacity for the San Joquin Valley. Idaho Power Co.'s outdoor hydro plants will get the same treatment with some salon-caliber photographs taken by our roving editor-cameraman.

For those interested in lighting, we have scheduled a picture-story on the outstanding new lighting job of the Olympic Coliseum in Los Angeles, with its many interesting features.

Industrially, we are working on stories of two new printing press installations in the Northwest which incorporate the very latest in control practices. Also in the offing is the story of a huge new "push-button" airline maintenance base just put in operation at San Francisco by one of the largest airlines.

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Cover Photo by Herbert E. Jonas, Pacific Power & Light Co.

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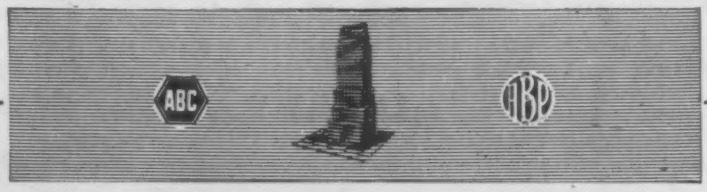

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VOL. 100
NO. 6

ELECTRICAL WEST (with which is consolidated The Journal of Electricity). June 1948. Vol. 100, No. 6. Published monthly by McGraw-Hill Co. of Calif. Price 25 cents a copy. Publication Office, 621 So. Hope St., Los Angeles 14, Calif. Executive and Circulation offices, Electrical West, 68 Post St., San Francisco 4, Calif. Entered as second class matter April 17, 1947, at the post office at Los Angeles, Calif., under the Act of March 3, 1879. Printed in U.S.A. Subscription rates—U.S., U. S. Possessions and Latin American Republics: $2, 1 year; $3, 2 years; $4, 3 years. Canada: $2.50, 1 year; $5, 3 years. Other countries: $3, 1 year; $5, 2 years; $6, 3 years.
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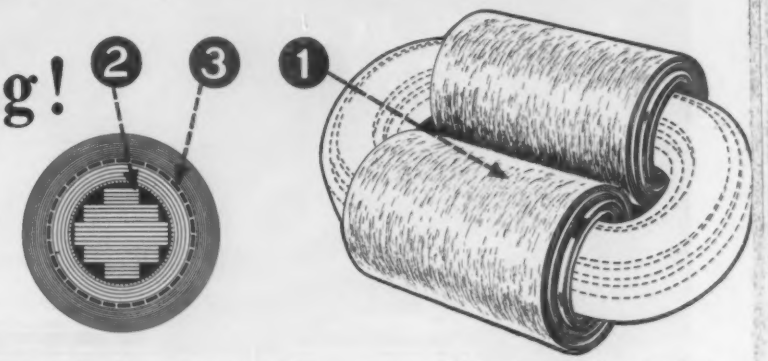
A "Balanced" Performance" Feature

GET high short-time overload capacity with L-M Round-Wound Transformers because of this 1-2-3 better cooling!

Here's what you get in the "Balanced Performance" of L-M Round-Wound design

1. Higher average impulse strength.
2. High short-time overload capacity.
3. High short circuit strength because of the round coils.
4. Increased revenue with better-than average regulation.
5. Improved ratio of losses with lower total loss.
6. Low exciting current compatible with other performance characteristics.
7. Lighter weight with no sacrifice of mechanical strength or adequate cooling capacity.



1. long round coils expose a maximum of surface to cooling oil

2. wound core with stepped cross section provides cooling oil passages between core and coils

3. oil duct spacers wound into coils provide cooling through the coils on larger sizes

. . . resulting in exceptional cooling . . . with low copper temperatures, fundamentally necessary for *high short-time overload capacity*

If you must overload 'em, L-M Round-Wound transformers have a *high thermal recovery* rate. Their superior 1-2-3 cooling characteristics insure rapid heat radiation back to normal temperatures to enable handling of repetitive peak loading conditions.

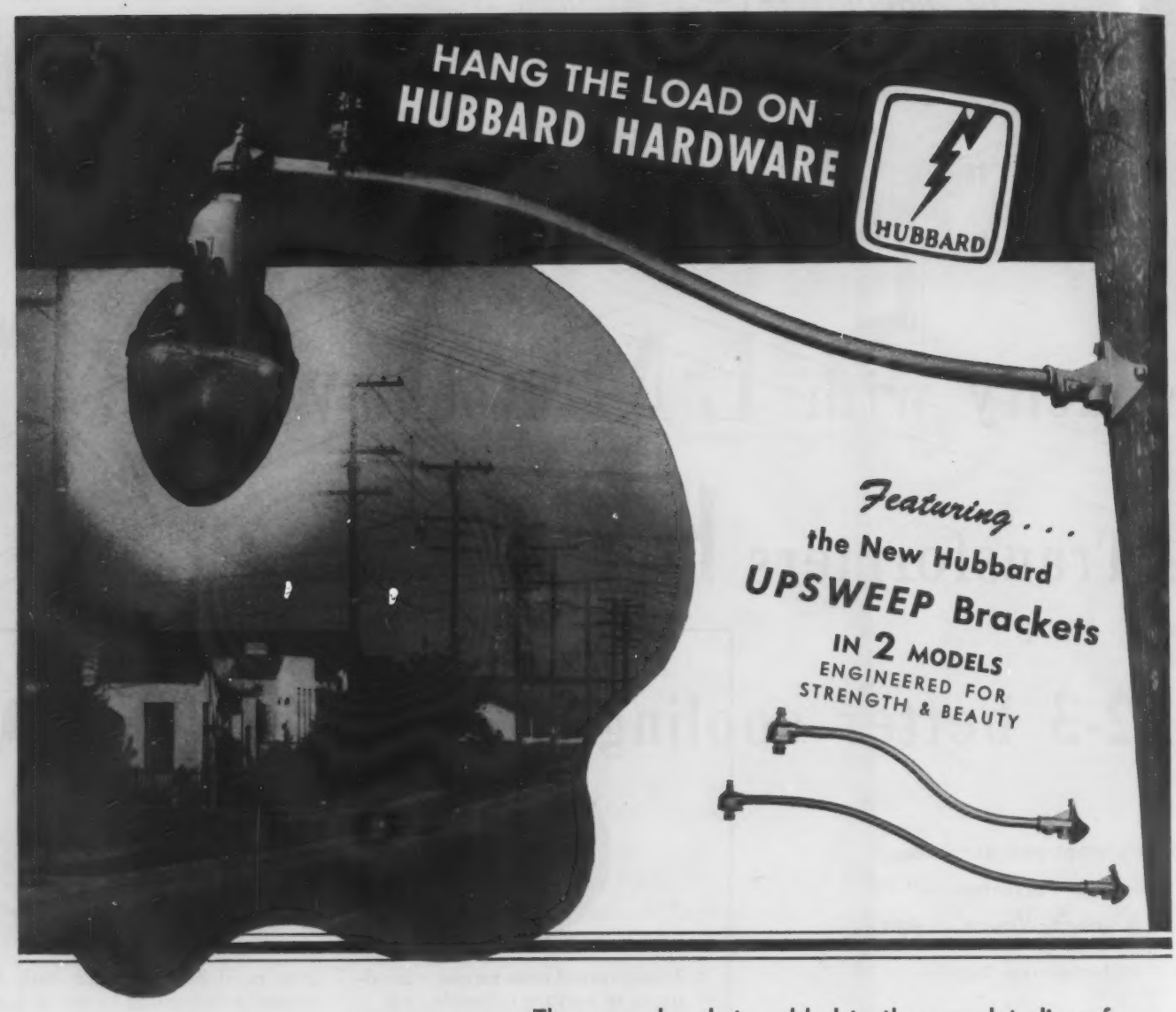
High short-time overload capacity is another plus in the "Balanced Performance" L-M Round-Wound transformers provide.

It's More Fun to Know

New Bulletin 16-G-1 gives general details of design and construction of L-M distribution transformers—and it's not bad reading either! Other bulletins cover special types. Ask for the information you want. **Write Transformer Division, Line Material Company, Zanesville, Ohio.**

LINE MATERIAL Transformers

L-M DISTRIBUTION EQUIPMENT INCLUDES: Distribution Transformers • Fuse Cutouts and Fuse Links • Lightning Arresters • Oil Switches • Pole Line Hardware • Line Construction Specialties • Underground Equipment • Fibre Conduit • Street and Airport Lighting Equipment • "Wired Radio" Control Equipment • Capacitors



HUBBARD STREET AND HIGHWAY LIGHTING UNITS

are distributed by all eleven Offices and Warehouses of the

GENERAL ELECTRIC SUPPLY CORPORATION

on the Pacific Coast

FOR BETTER SERVICE

These new brackets, added to the complete line of HUBBARD HARDWARE are carried in stock. You can depend on the General Electric Supply Corporation as your source of supply for prompt, fast service. The facilities of the General Electric Illuminating Laboratory bringing you competent engineering advice are available through the nearest GENERAL ELECTRIC SUPPLY CORPORATION office without obligation or expense.

GENERAL ELECTRIC SUPPLY CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • FRESNO • LOS ANGELES
SAN DIEGO • PHOENIX • SEATTLE • PORTLAND • TACOMA • SPOKANE

HUBBARD OFFERS A COMPLETE LINE OF MASTARMS AND LIGHTING BRACKETS

In keeping with the pattern and appearance of modern street and highway lighting, Hubbard offers the new *UPSWEEP* lighting brackets which have been designed and engineered for structural strength and functional beauty. Added to the complete Hubbard line of rigid and adjustable mastarms and diversified types of hood brackets, the *UPSWEEP* brackets add a new note of style and utility to pole mounted lighting fixtures. Available in two sizes of 4 ft. and 6 ft. lengths, these new *UPSWEEP* brackets are adaptable to narrow roadways as well as broad streets and highways. They are designed to extend whatever luminaire is selected, at the proper location for greatest lighting coverage and efficiency. Investigate the new Hubbard *UPSWEEP* bracket, it's easy to install and maintain. Rely on Hubbard for electrical pole line lighting equipment.

Featuring the New Hubbard
UPSWEEP *Brackets*

IN 2 MODELS
ENGINEERED FOR STRENGTH AND BEAUTY

HUBBARD POLE LINE HARDWARE INCLUDES:

- ★ STANDARD POLE LINE HARDWARE
- ★ CABLE MATERIAL FOR OVERHEAD AND UNDERGROUND CONSTRUCTION
- ★ COMMUNICATION SYSTEM HARDWARE
- ★ ELECTRIC RAILWAY HARDWARE
- ★ STREET LIGHTING EQUIPMENT
- ★ RURAL ELECTRIFICATION MATERIAL

HUBBARD

Hubbard and COMPANY
OAKLAND, CAL. PITTSBURGH CHICAGO

HANG THE LOAD ON HUBBARD HARDWARE

HUBBARD

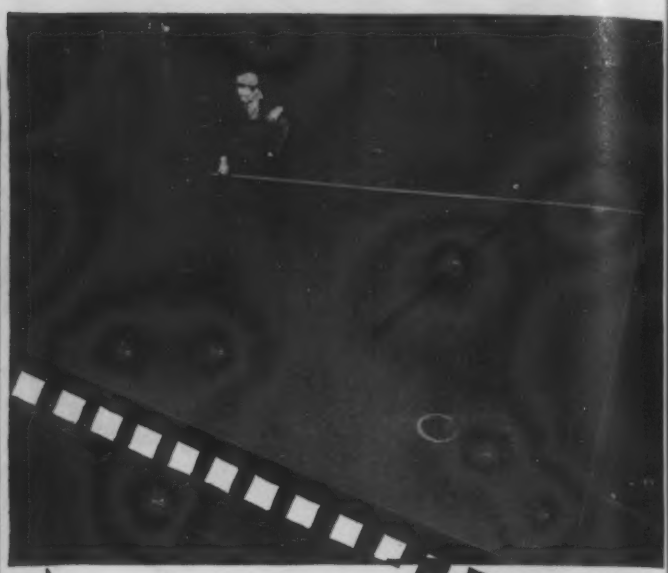
TANK CONSTRUCTION

ANOTHER IMPORTANT PHASE IN THE MANUFACTURE OF

The importance of good tank design and construction is sometimes overlooked by purchasers of power transformers. Tanks which are poorly designed and improperly built can result in extra installation and maintenance expense.

A transformer tank must be a ruggedly-built structure, not only to support the weight of the core-and-coil assembly, oil, and various auxiliary parts, but also to withstand, without distortion, the stresses and strains imposed upon it in shipment and installation.

It is because Moloney has long recognized the importance of proper tank construction, that you will find Moloney transformer tanks particularly well-designed and well-built.



1 Next in line of importance to the engineering job of designing the tank, is that of the layout man in accurately marking the steel plates and shapes for other workmen to perform the cutting, bending, and welding operations which convert these materials into a completed tank.

4 In order to support the tremendous weight of a large power transformer the base must be strongly constructed. Here we see the steel reinforcing structure being welded to the tank base. Heavy steel beams and channels prevent distortion and provide weight support, enabling the transformer to be moved on its own wheels or on rollers, without damage.

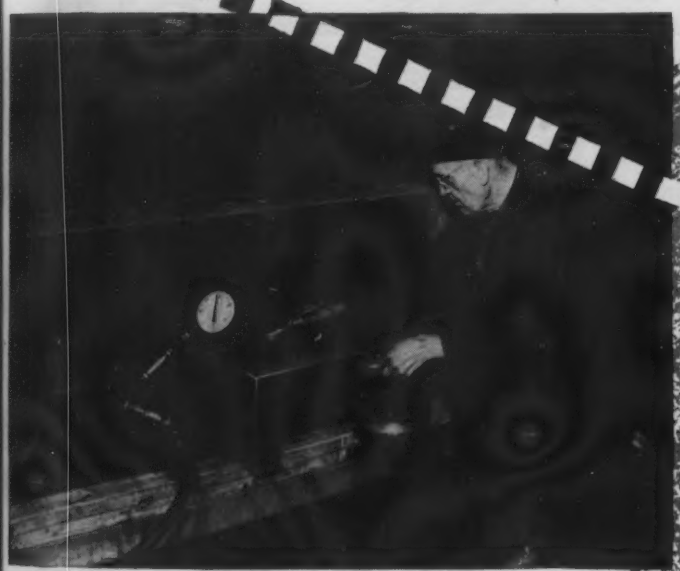
5 The tank cover must not only provide a weather-proof, gas-tight seal, but must also support the bushings. Photo shows bushing collars being welded to cover. Since bushings used on large, high voltage power transformers are quite heavy, steel reinforcements are welded to the underside of the cover. After completion of this operation the cover is punched for bolting to the tank.

MOLONEY

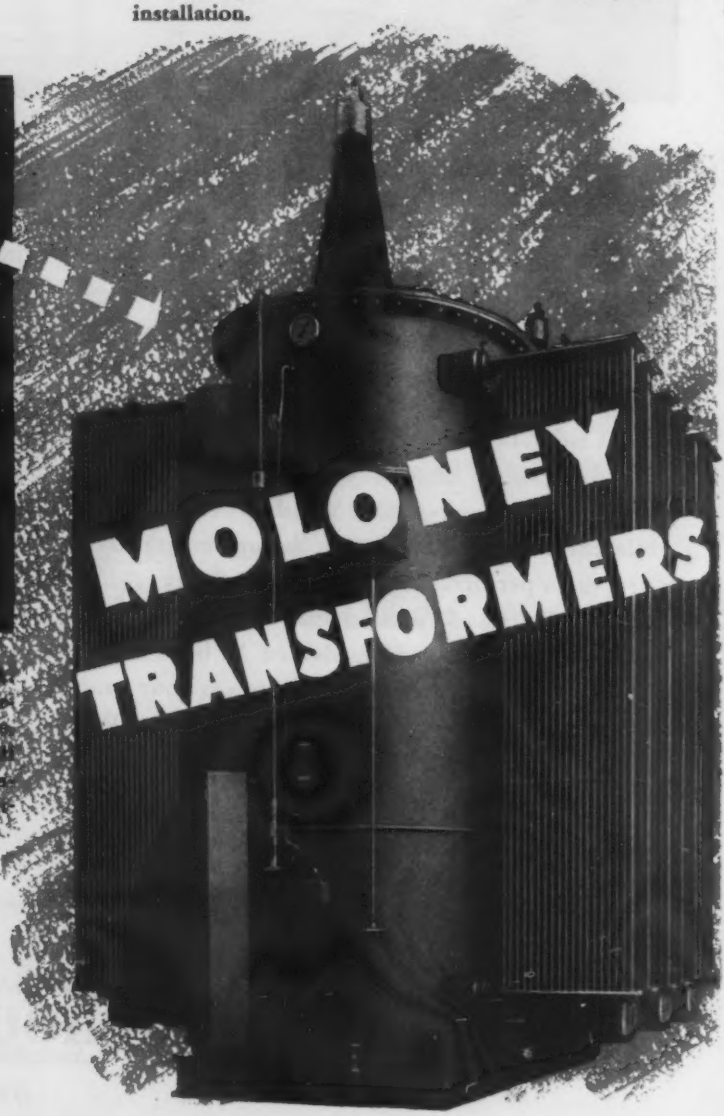
POWER AND DISTRIBUTION TRANSFORMERS EXCLUSIVELY SINCE 1896 • FACTORIES AT ST. LOUIS,

2 Here we see steel being rolled to form a section of the tank wall. The workman is operating the overhead electric crane holding the steel while the rolls operated by another workman curve the steel plate according to the layout man's markings. As this operation progresses, it is checked again and again until the exact shape specified is obtained.

3 After shaping, the tank sections are welded together by means of automatic seam welders. The seams are welded both on the inside and outside. Shown here is the inside seam welding operation. After this, heavy steel angles or Z bars are welded to the tank wall to provide reinforcement, enabling tank to withstand, without distortion, pressure of the cooling oil and stresses encountered in shipment and installation.

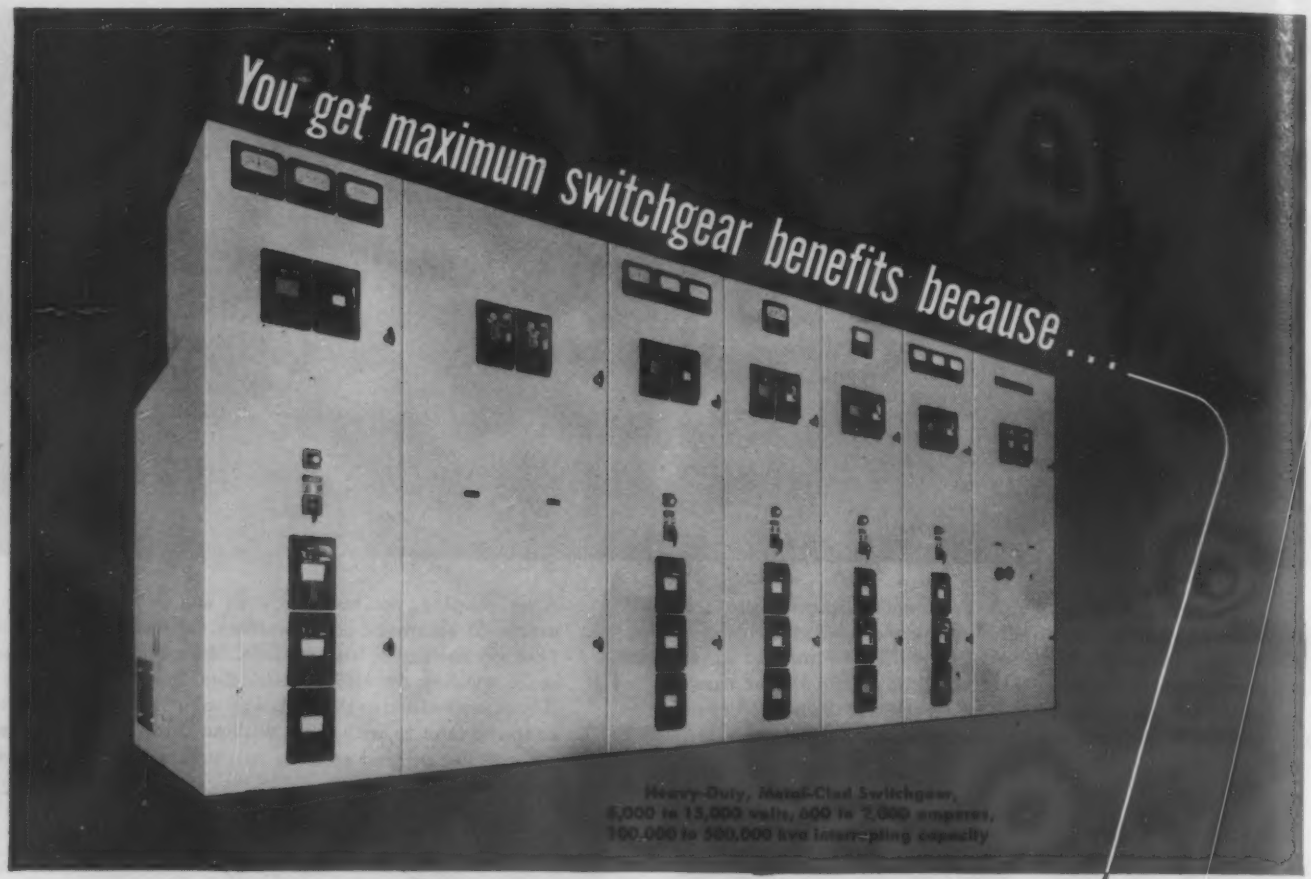


6 Shown here is the final inspection of the transformer tank. Every welded seam, and every connection point is thoroughly examined for possible leaks under air pressure. The inspector is covering the seams with a liquid which will indicate even the most minute leak. After this careful inspection the tank is completely sand blasted and then painted before the core-and-coil assembly is installed.



ELECTRIC COMPANY

MISSOURI AND TORONTO, ONTARIO, CANADA.



Heavy-Duty, Metal-Clad Switchgear, 5,000 to 15,000 volts, 600 to 2,000 amperes, 100,000 to 500,000 kva interrupting capacity

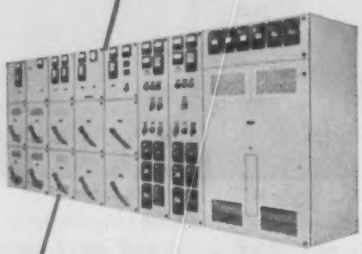
It's a case of getting all 10 in all 3!

When you standardize with Westinghouse Unitized Switchgear you gain ten important benefits—some immediately—others throughout the course of its operation. And you gain these advantages, regardless of the nature of your requirements, because standardization has been applied to all three types of Westinghouse Switchgear—Heavy-Duty, Metal-Clad...Light-Duty, Metal-Clad...Low-Voltage, Metal-Enclosed.

Standardization benefits you because it permits constant use of proved manufacturing methods that produce high product quality while effecting big cuts in manufacturing time and costs. The results are superior performance . . . quicker delivery . . . lower installed price.

Specifically, standardization provides all the benefits listed below. Just how it does this is explained in booklets currently available. Write—indicating your requirements—to your nearest Westinghouse office or to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-60667

Light-Duty, Metal-Clad Switchgear, 5,000 volts, 600 to 1,200 amperes, 50,000 kva interrupting capacity.



Low-Voltage, Metal-Enclosed Switchgear, 600 volts maximum, 15 to 6,000 amperes, 15,000 to 100,000 amp. interrupting capacity.

- Lower planning and ordering costs
- Lower manufactured cost
- Lower installation cost
- Lower operation and maintenance costs
- Greater service continuity
- Greater safety
- Greater versatility
- Longer life
- Shorter manufacturing time
- Superior equipment for outdoor requirements

IT'S STANDARDIZED!

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

UNITIZED SWITCHGEAR
INDOOR AND OUTDOOR SERVICE

HOME AND FARM WIRING MADE EASIER WITH

RoFlex

ROME'S NEW NON-METALLIC SHEATHED CABLE

On your next wiring job you will do well to specify and install RoFlex. It will save you time . . . and installation costs.

Further, this new Rome Cable product is designed and manufactured for long-time dependable service . . . a quality product for a quality job.

The man on the job will find RoFlex is easy to strip . . . smaller in diameter . . . lighter in weight . . . cleaner to handle. It's what the electrician calls "easy to work."

Here's why . . .

1. The thermoplastic insulated conductors strip easily leaving bright, clean copper for quick connection. The insulation is highly resistant to oils, acids, moisture, flame . . . is permanently colored for quick and easy circuit identification.
2. A spiral wrap of specially treated paper covering each conductor provides light-weight, durable protection against mechanical injury . . . yet, strips back easily.
3. Impregnated jute fillers in each valley give the finished cable increased longitudinal strength, and serve as "rip-cord" for stripping outer braid.
4. The outer cotton braid is flame and moisture resistant. The uniformly small diameter saves space in outlet boxes and fits smaller holes.

Yes, there's three way satisfaction when you standardize on RoFlex . . . a job well done . . . a satisfied customer . . . low cost installation. Make sure that your supply of RoFlex is adequate for your needs.

FOR YOUR NEXT "FLEX" JOB . . . INSIST UPON ROFLEX

ADEQUATE WIRING SERVES AND SAVES

Underwriters' approved for 60° C operation under the 1947 National Electrical Code.

EASY TO STRIP

SMALLER IN DIAMETER

LIGHTER IN WEIGHT

CLEANER TO HANDLE

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

PACIFIC ELECTRO SALES, INC., Pacific Coast Agents

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LOS ANGELES 21, CALIF.
2038 Bay Street

SAN FRANCISCO 3, CALIF.
1045 Bryant Street

SEATTLE 4, WASH.
3401 Fourth Ave., So.

"We have installed... capacitors equal to 34% of our peak-load and have gained more system capacity in less time and at less cost than we could have in any other way"

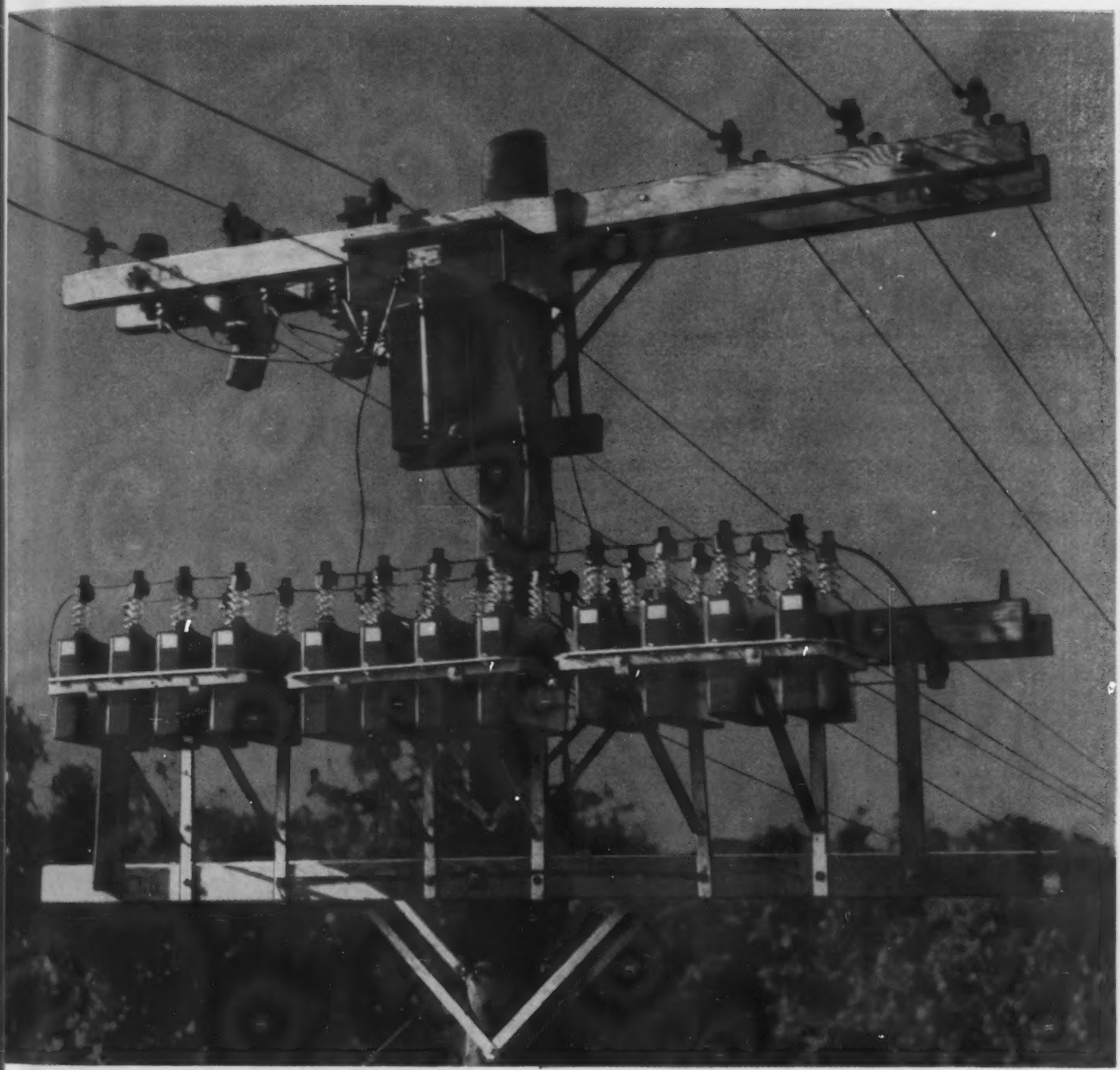
THE BROCKTON EDISON CO.

THE Brockton Edison Company has this to say about capacitors:

"By 1941, rapid increase in loads indicated a need for major system improvements. More system carrying capacity was needed. Voltage control requirements were increasing and additional voltage taps on our transmission transformers appeared necessary.

"Capacitors were considered along with other methods for increasing carrying capacity. We had three installations, the oldest dating from 1920, so we knew they were reliable. A system study showed this: widespread installation of capacitors would give us better voltage regulation and more carrying capacity than any other plan we were considering. Capacitors would cost less, could be delivered faster, and could be installed more easily. And they could be purchased a group at a time, as we needed them.

"With the installations made last year, we now have 34 kvar in capacitors for every 100 kva of system peak load. All are automatically switched in pole-mounted groups, located at the load center of distribution feeders. In our program, time clocks are used to control the switching of each individual in-



stallation, so that the system benefit from the locally supplied kilovars does not depend on temporary conditions on individual feeders.

"We now have more peak-load capacity, less voltage drop and lower distribution and transmission losses, than any of our other proposals could have provided. The total cost for these capacitors has been lower than the expenditure which otherwise would have been necessary."

The purpose of these advertisements is to encourage electrical utilities to exchange information on the use of power-factor-improvement capacitors. We believe that such an exchange will best bring out that capacitors can be used much more widely than at present—that they provide the fastest way of increasing peak-load capacity—that they can bring many utilities extraordinary returns by increasing capacity of existing distribution lines, transmission lines, transformers and circuit breakers—and that they offer one of the best possibilities of scaling down system costs per kilowatt. If your experience with capacitors would be of interest and value to other companies, we would like to hear from you. Contact your G-E Representative or write *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

GENERAL ELECTRIC

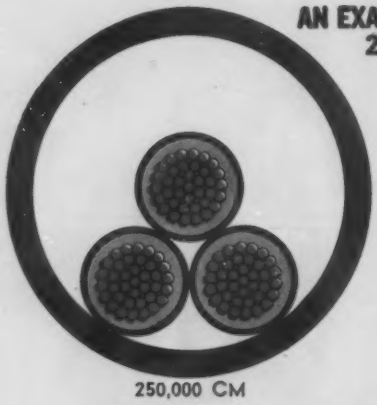
37-126

CRESCENT

ENDURITE Type RH

Gives Greater Current Carrying Capacity per Dollar of Installed Cost

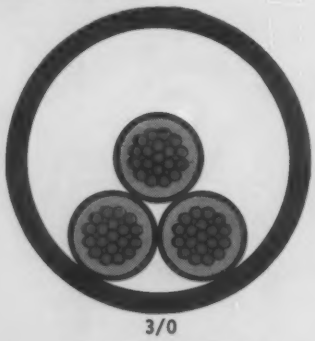
AN EXAMPLE-
200 AMP. CIRCUIT*



250,000 CM

TYPE R

Requires 2½" Conduit. Maximum permissible operating temperature 60°C.



3/0

TYPE RH

Requires 2" Conduit. Maximum permissible operating temperature 75°C.

The superior heat resistant characteristics of CRESCENT ENDURITE INSULATION with its higher permissible operating temperature and therefore greater current carrying capacity, permits the use of a smaller size of conductor, and in most cases smaller size of conduit at less cost than would be required for Type R Wire for the same load.

For light loads requiring small sized conductors, Voltage Drop is the determining factor in choice of wire size. Usually in sizes No. 6 AWG and heavier for power circuits or No. 1 AWG and heavier for lighting circuits, CRESCENT ENDURITE Type RH Wire & Cable gives the lowest installed cost-per-ampere of useful circuit capacity.

**In Accordance with 1947 National Electrical Code*

CRESCENT

WIRE and CABLE

CRESCENT INSULATED WIRE & CABLE CO.

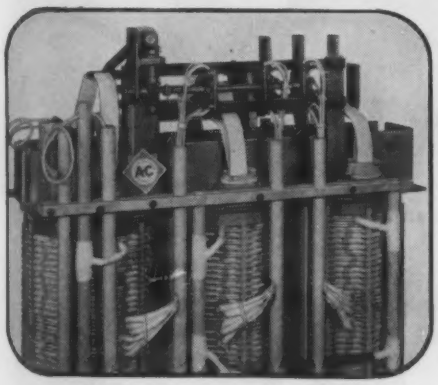
TRENTON, NEW JERSEY

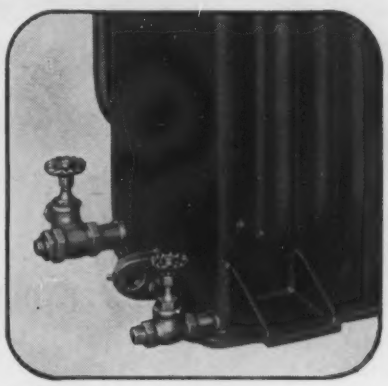
Choosing Network Transformers?

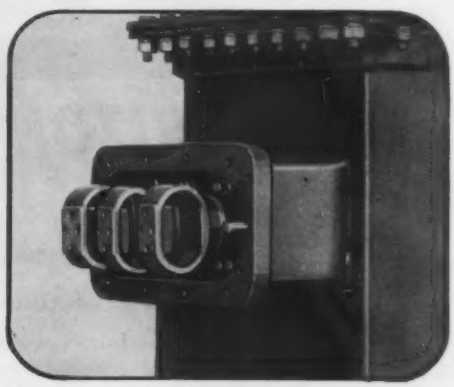
Allis-Chalmers Improved Units Meet Any System Need!

1 THEY'RE SMALLER IN OVERALL SIZE— without any reduction in rugged design typical of this class of transformers. They can be designed to meet any system specifications — size, electrical characteristics, mechanical features, etc.

2 HIGH VOLTAGE SWITCH is interlocked for complete safety. Operating handle is located on side of case, and can be padlocked. A toggle prevents throwing switch through transformer position when moving from open to ground or vice versa. A 2294







3 COMPACTLY DESIGNED! Rugged circular core and coil design — outside core clamping bolts, sturdy turn-to-turn insulation — withstands heavy short circuit stresses. Thermal capacities are high, even under the most severe load conditions.

4 ABOVE, LEFT is drain valve, complete with sampling device. The valve is of a convenient size to also serve as a bottom filter press connection. At lower right is the top filter press connection and valve. Note the convenient, sturdy jacking bosses.

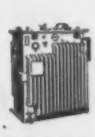
5 THIS LOW VOLTAGE THROAT in Allis-Chalmers improved network transformers is designed to fit any standard network protector. Result: you can "team" the *best* protector with the transformer *you* want! Consult, ALLIS-CHALMERS, MILWAUKEE 1, WIS.

TRANSFORMERS ALLIS-CHALMERS BUILDS!

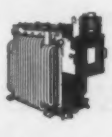
POWER — 500 kva to largest. Dry-type or liquid-filled.

⅝% STEP REGULATORS — single phase 2.4 to 15 kv; 3-phase 2.4 to 69 kv.

DISTRIBUTION — 1½ to 500 kva. Pole, vault, subway, substation and dry-types.



LOAD CENTER— 100 to 2000 kva. Dry or liquid-filled. Indoor or outdoor.



NETWORK—150 to 1000 kva. Vault or subway types.

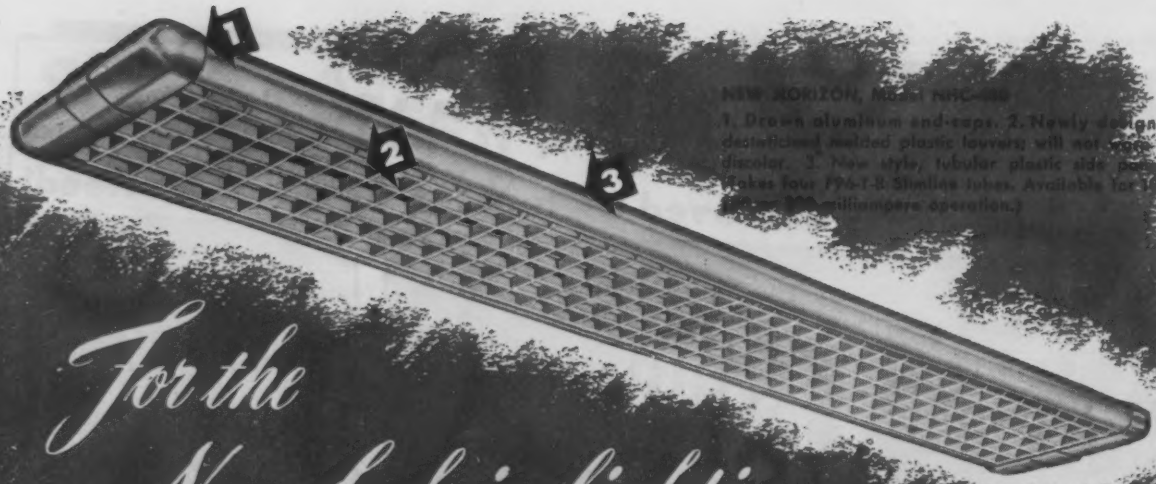
FURNACE — Indoor or outdoor. Water or self-cooled. All ratings.

INSTRUMENT — potential, current, and signal, indoor and outdoor types; outdoor metering. Standard voltages.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

A CENTURY OF SERVICE to Industry THAT MADE America Great



For the New Look in lighting . . .

Leader

NEW HORIZON Fluorescent Fixture

● A look at *tomorrow* in luminaires: our NEW HORIZON. A slimmed-down silhouette that blends naturally and easily into smart architectural trends. But—above all—this latest of LEADERS has these definite operational advantages:

The beautiful NEW HORIZON (nesting instant-start Slimline lamps) is *easy to install . . . easy to service . . . releases more light with less surface glare.* And it gives its abundance of light longer . . . at *lower maintenance costs.*

For full information on the carefully-conceived advantages of the *New Horizon* series, write today.

LEADER ELECTRIC COM

3500 NORTH KEDZIE • CHICAGO 18, ILL. • W nd 6, Calif.

...especially de-...available in one to... ...ree lamp (NHO-380)... ...ion; 100, 200 or 300 milliampere operation.

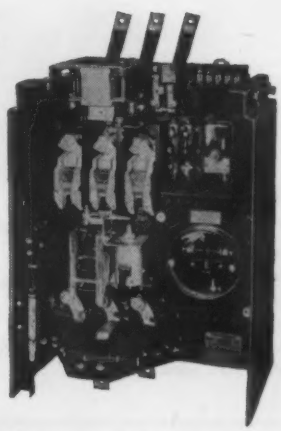
The NEW HORIZON Incandescent Spotlight. Excellent for highlighting displays. Available for corner installations (Cat. No. LS-40) or between fixtures in continuous runs (Cat. No. LS-70).

. . . TO IMPROVED SERVICE CONTINUITY IN MEDIUM-DENSITY AREAS!

Now you can extend the advantages of a-c secondary network systems to medium-density areas . . . where there is a growing demand for improved service reliability, voltage regulation and system flexibility. You can do it economically, too, for the new CM-88 network protector was developed specifically for use in areas with overhead distribution lines where a modified or low-cost form of secondary network is practical. These would include small outlying business sections and heavily loaded residential areas in large cities, and the commercial districts in smaller cities and large towns.

The protector is an automatic, electrically-operated air circuit breaker, controlled by network relays. The opening of the protector automatically isolates a faulted primary circuit or network transformer *without interrupting the power supply to any consumer.*

In broadening the field for a-c network systems, Westinghouse offers a practical solution to your service problem in areas of lighter load density. For more information on the CM-88 call your Westinghouse office or write for booklet B-3977. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60670



The CM-88, light-duty, network protector removed from weatherproof enclosure. The unit can be mounted on a pole or crossarm with existing transformers.

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

NETWORK PROTECTORS

why Okonite continues to use

UP-RIVER FINE PARA RUBBER

for cable insulation

with today's installation costs* only the

Longest-Lived will be economical

* The lifetime cost of a cable rather than its first cost is the only true measure. Okonite wires and cables, built to stand up better and longer, can offset high installation costs.

For obtaining rubber insulation of the highest dependability, Okonite researchers and independent authorities, too, remain convinced that only the highest grade natural rubber provides all the needed factors. That's why, in spite of its premium price, Up-river Fine Para rubber is still used by Okonite for insulating wires and cables.

Its long life is proved. Service records over the years establish this beyond question. It possesses greater uniformity, and accumulated data show it gives better aging qualities than plantation or any other type of rubber.

Okonite cannot afford to endanger its customers' best interests by sacrificing the known value of Up-river Fine Para rubber for the lower-cost synthetic rubbers which have no extended service record. Experience has shown that accelerated aging tests, however promising, are not a sound basis for judging the life of products having different components.

Published evidence demonstrates that synthetic rubbers — no matter how well compounded — give inferior results in 2 or more of the following essential characteristics: elongation, tensile strength, insulation resistance, power factor, effect of moisture on electrical properties, consistent and stable electrical values.

Find out more about the steps Okonite engineers are taking to build true value into cables. The selection of rubber is only one of many described in Research Publication WE-101. Address The Okonite Company, Passaic, N. J.

6449

OKONITE SINCE 1878 insulated wires and cables

THE BEST CABLE IS YOUR BEST POLICY

Shell scientists believe you can profit by knowing about

SHELL TALONA OIL

developed to be the world's finest heavy duty oil

Figure what oil breakdown can cost you

With sludge, carbon and lacquer come ring-sticking . . . lowered efficiency and engine wear. And your cost is more than repair and replacement. The *time out for overhaul* runs operating costs way up . . . and cuts profits way down.

Nine years work went into Shell Talona Oil

A hundred or more formulas were developed and tested by Shell Research to find ways to strengthen oil . . . help it resist acid, sludge, carbon and lacquer formation. Yes, and *reduce engine wear.*

One oil, now marketed as *Shell Talona Oil,* was in a class by itself. In the most grueling tests, Shell Talona Oil kept sludge to a harmless minimum; kept bearings free from corrosion; kept pistons and rings virtually free of carbon and lacquer deposits. And as for wear —it couldn't be measured by ordinary standards on pistons or cylinder walls.

It pays off to you this way

In high speed Diesel and heavy duty gasoline engines, Shell Talona Oil promises less engine wear . . . longer operation at peak efficiency. Fuel economy should improve. And with proper care of your air cleaners and oil filters, periods between overhauls should lengthen considerably.

Ask your Shell representative for Shell Talona Oil. It's on sale now—and there's absolutely no other like it.

ARE YOU ABSOLUTELY SURE YOU ARE GETTING ALL THAT'S NEW IN LUBRICATION?
Your Shell Lubrication Engineer can make a complete study and analysis of your plant and machines . . . give you engineering counsel, advice on new lubricants and their application . . . help you set up schedules and controls for each and every machine. For that kind of service, call in your Shell Lubrication Engineer.

SHELL

why it will pay you to specify

STANDARDIZED NETWORK EQUIPMENT

The a-c secondary network system is recognized as *the* lowest-cost system for providing high-quality service to heavy load areas. It is normally the most economical high-quality service system for business sections of cities—50,000 or more in population—and will frequently pay its way in smaller towns as well.

But—to realize the full savings possible with networks, you *must use standardized* network equipment.

FASTER DELIVERY. Invariably, G-E standardized network transformers and protectors can be supplied on shorter delivery. No special engineering is required—production facilities are set up to manufacture standardized units.

LOWER PRICE. G-E standardized network units are normally appreciably lower in price than non-standard designs.

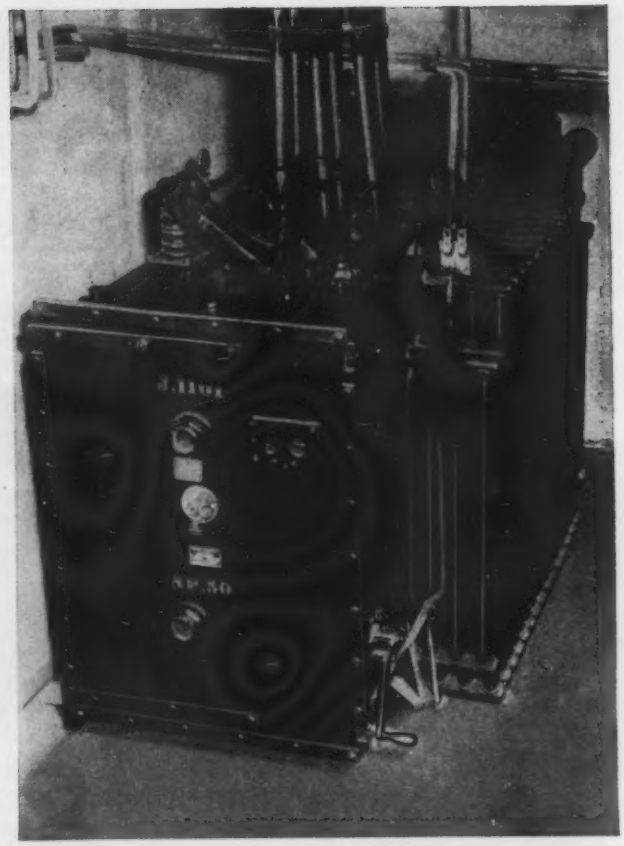
SUBSTANTIALLY LOWER INSTALLATION COSTS. G-E standardized network transformers and protectors are designed for a long, narrow vault. In length, width, overall height—and particularly in location of cable entrances, accessories, valve and filter-press connections—standardized equipments are of the most economical design from the standpoint of vault construction and installation costs.

SAVINGS IN MAINTENANCE. G-E standardized network equipment incorporates all the maintenance-saving developments which the industry recognizes as desirable. Transformer cover and switchbox are welded, not bolted, to the transformer—the tap changer is located behind a pipe plug. Thus major gaskets are not needed. Transformer accessories are grouped in one location for maximum convenience.

An inquiry to your G-E Representative or a letter to *Apparatus Department, General Electric Company, Schenectady 5, N.Y.*, will bring you information on standardized network equipment—and just what should be specified to secure the savings which this equipment makes possible. Bulletin GEA-5024 describes network transformers; GEA-2017, network protectors.

ALL THE FEATURES YOU NEED ... NO COSTLY EXTRAS

G-E standardized transformers and protectors include all accessories, all features, that the majority of users of network equipment have found desirable.

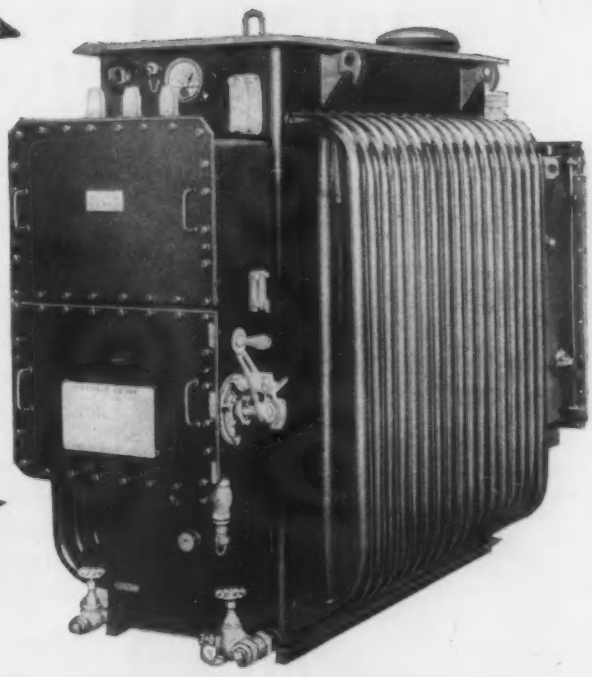


TOP CONNECTIONS OF TERMINALS, for both high- and low-voltage cables, are well below top of transformer, allowing room for larger radius bends of cables in shallower vaults. Maximum interchangeability between various sizes is also provided.

THE PHYSICAL SIZE AND ARRANGEMENT of G-E standardized network equipments mean minimum vault construction costs. These equipments are designed for vaults with widths of 4½ feet or less—vaults which can generally be built between building line and curb, and which reduce appreciably the problem of roof-slab construction.

AUTOMATIC SYSTEM PROTECTION is provided by the network protector which trips on reversal of power. When conditions are corrected, it recloses automatically. Protector case is submersible. With the door open, the protector unit can be slid out on rails for ready inspection. Dust-tight relays can be easily removed and replaced for checking.

MAJOR TRANSFORMER GASKETS ARE ELIMINATED by welding, not bolting, transformer cover and switchbox to the main unit. Locating tap changer behind a pipe plug eliminates a packing gland around an external shaft.



ALL TRANSFORMER ACCESSORIES— liquid-level gages, thermometer, pressure test valves, tap changer, drain valves, sampling valves and filter-press valves—are located at the high-voltage end of the transformer where they are readily accessible. Bushings themselves can be removed externally, without opening the main transformer tank.

THE HIGH-VOLTAGE SWITCH is a three-position disconnecting and grounding switch with electrical interlock to prevent operation when the transformer is energized either from the high-voltage or low-voltage side.

COOLING TUBES may have a wall thickness of 3/32 inch (vault-type) or of 5/16 inch (subway type). This is the only difference between the vault-type and subway-type transformers. The tank casing is made of a 5/16-inch plate. Both types—designed to withstand a full 7-pounds-per-square-inch, 24-hour pressure test—can be completely submerged without damage or interruption of service. Both types are protected by a superior G-E painting system, developed specifically for severe underground service.

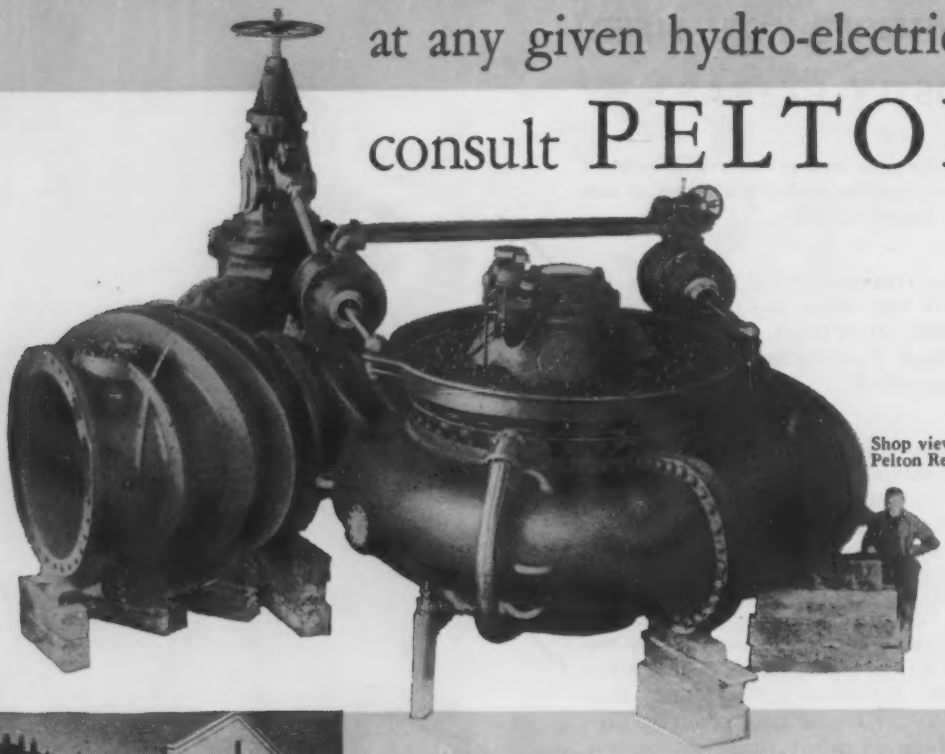
GENERAL ELECTRIC

402-74

For MAXIMUM POWER DEVELOPMENT

at any given hydro-electric site . . .

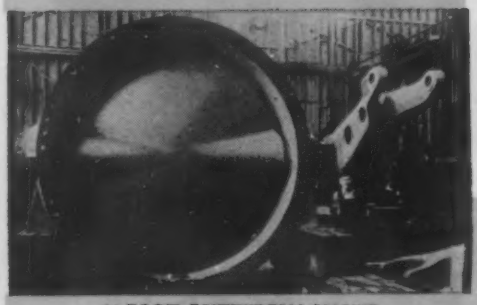
consult PELTON



Shop view of 44,000 hp. Pelton Reaction Turbine.

Pacific Gas and Electric Company's Dutch Flat Power House in California where one 29,000 hp. Pelton Reaction Turbine is installed.

City of Tacoma's Alder Dam and Power House where two 34,500 hp. Pelton Reaction Turbines are used.



10-FOOT BUTTERFLY VALVE

Pelton has the hydraulic engineers, the long experience and the gigantic machine tools for building huge valves for penstocks carrying water to Pelton Turbines which are made in sizes up to 70,000 horsepower and more.

PELTON is COMPLETING TURBINES for use in North America, Colombia, Peru and Africa

To develop the maximum horsepower at any given hydro-electric site, Pelton engineers design the turbine for the particular water conditions.

That is why Pelton is building turbines for installation over the world.

Throughout 66 years of turbine construction, Pelton has made laboratory experiments as to the shape and contour of impulse buckets, the curvature of reaction-turbine runners, sizes, abrasives in the water and so on.

Then the Pelton organization of skilled men using modern machine tools builds the turbines and skilled engineers supervise installation and check performance.

Such accumulation of science and manufacturing experience assures purchasers that each turbine will develop the required horsepower at any given hydro-electric site. Moreover, Pelton Turbines are built *right*—to withstand long years of continuous operation free from trouble.

BLW THE BALDWIN GROUP

The PELTON WATER WHEEL Company

Subsidiary of The Baldwin Locomotive Works

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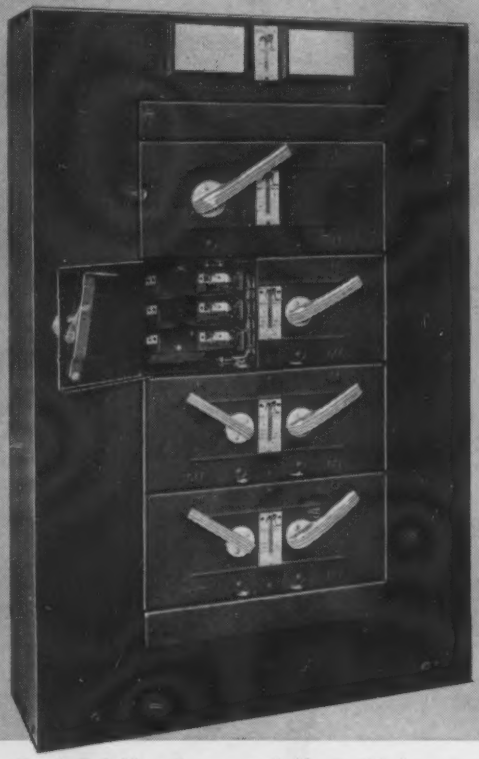


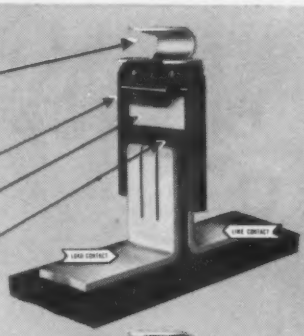
Vacu-Break Switchboards are available in 30 Amp. to 600 Amp., 2 & 3 pole circuits, 575 volts and less. BullDog manufactures Vacu-Break Safety Switches • SafToFuse Panelboards • Superba and Rocker Type Lighting Panels • Switchboards • Circuit Master Breakers • "Lo-X" Feeder BUStribution DUCT • "Plug-In" Type BUStribution DUCT • Universal Trol-E-Duct for flexible lighting • Industrial Trol-E-Duct for portable tools, cranes, hoists.

1 Switch head bracket attached to operating lever pushes the head (enclosing moving contacts) in and out on the stationary contacts.

Steel spring for pressure contact.

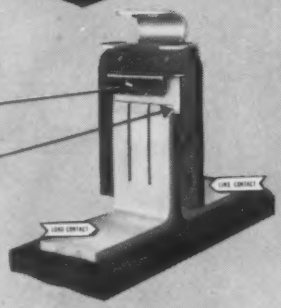
Moving contact (copper slug).

Close-fitting, partitioned arc chamber confines and snuffs out incipient arcing.

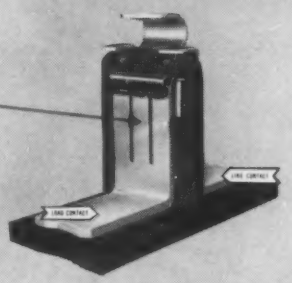


2 When operated to the OFF position, the Clampmatic spring accelerates upward (disconnect) action.

When operated to ON, the moving contact first engages the stationary contact prongs, before the spring moves down.



3 In full ON position, the moving contact fits tightly between stationary "line" and "load" contacts under full pressure by the Clampmatic spring.



Ever see a switchboard that's a quick-change artist?

ODDS are that sooner or later you'll want to add a new circuit, or remove an existing circuit or make a replacement in your electrical distribution system.

Such changes were once costly. But they're easily and economically made with the BullDog compact-type Vacu-Break Switchboard, a real artist for quick changes.

Vacu-Break Switchboards offer standardized switch units that are interchangeable and convertible. They can be added or removed easily, individually or in groups.

But flexibility isn't all. Here, too, is the valuable BullDog Vacu-Break principle of switching that smothers arcs instantly and safely before burning and pitting occur.

Self-aligning Clampmatic Contacts are tight as a bolted connection. They assure high conductivity, low heat losses, long life, minimum maintenance.

Don't put up with inefficient ganging of individual safety switches on makeshift racks. Contact your nearest BullDog Field Representative for more information about these remarkable Vacu-Break Switchboards.

BullDog's Field Engineers welcome the chance to sit in on planning stages of a building project. Their knowledge of electrical distribution layout can mean savings in installation and maintenance costs, as well as highest efficiency and reliability in actual operation. Why not take advantage of this pre-building service?

BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

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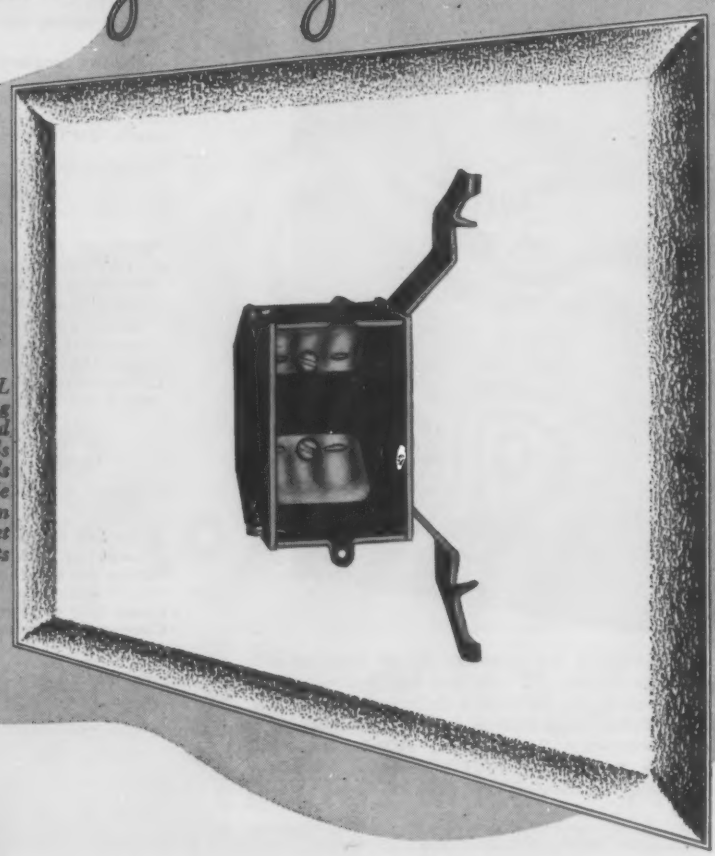
1445 Stevenson St. Tel. Hemlock 1-2470
San Francisco 3, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Jefferson 2224
Los Angeles 11, Calif.

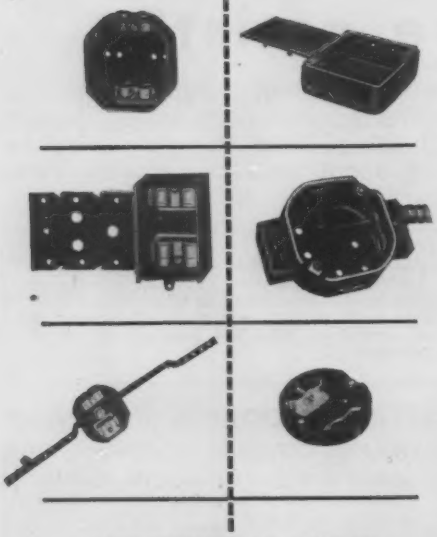
You can always rely on Raco



RACO BLNO BOX

A real time saver in a STEEL bracket switch box. Long nailing prongs gauge in bracket and hold box in correct position until nails are driven. "NM" clamp affords complete protection to the cable and provides entrance to box from ends and back—or both. Bracket is projection welded—knockouts are "Pri-Out" equipped.

A BOX FOR EVERY NEED



RACO PRODUCTS ARE LISTED BY UNDERWRITERS LABORATORIES, INC.

RACO

ALL-STEEL PRODUCTS

RACO Switch and Outlet Boxes

Profit by the line of least sales resistance! It's no secret that designers, architects and electrical contractors—the country over—prefer and demand the RACO line. There's a box and cover, accurately made and machined, tailored to fit the particular needs of every type of installation. Sturdy RACO boxes in their smooth, lasting black or galvanized finish, are built to do the job right!

* * *

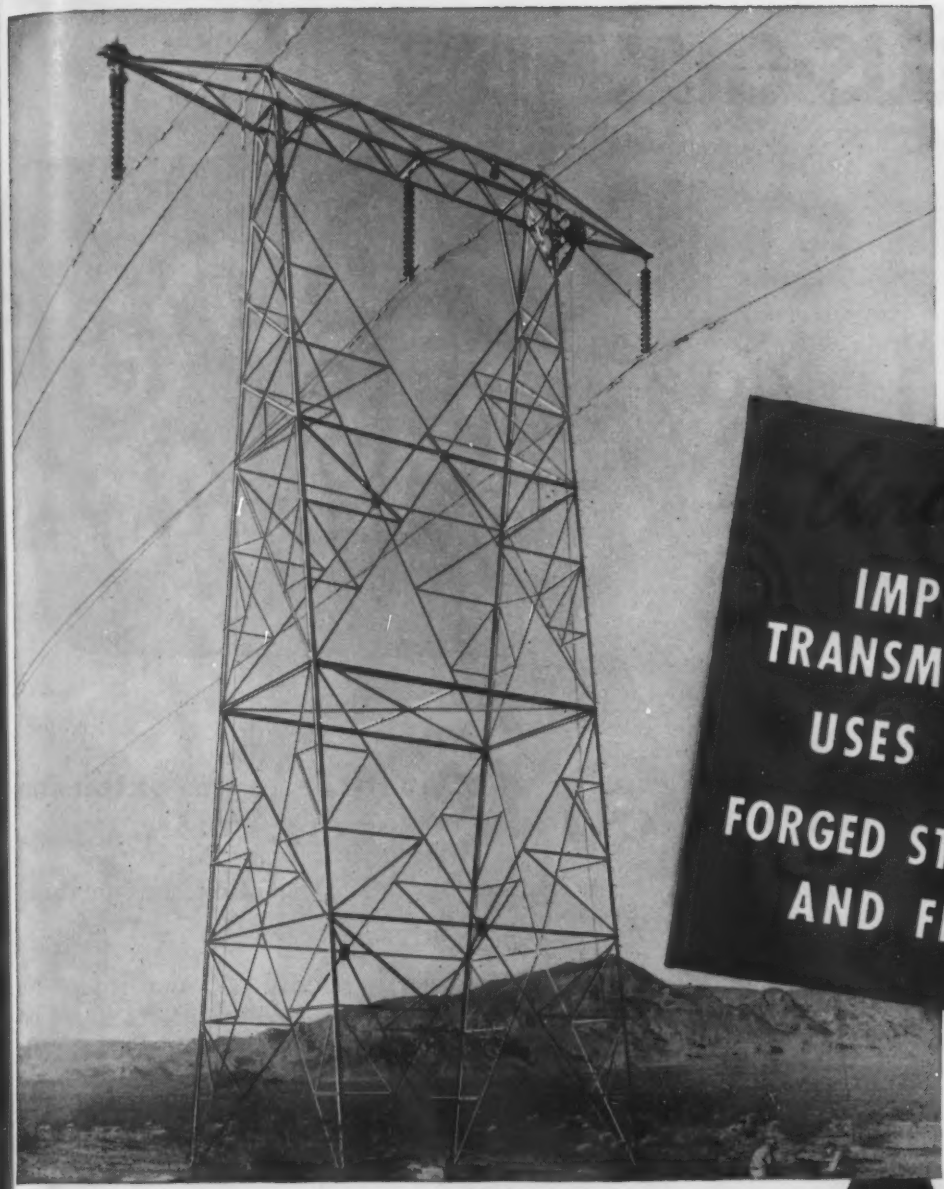
A-S-E STEEL PRODUCTS FOR MANY USES

STEEL OFFICE FURNITURE • WARDROBE, STORAGE, AND COMBINATION CABINETS • CLOTHING LOCKERS • INDUSTRIAL EQUIPMENT FOR FASTER MATERIALS HANDLING • FROZ-N-FOOD LOCKERS • ELECTRICAL OUTLET AND SWITCH BOXES.

ALL-STEEL EQUIPMENT INC., 500 Kensington Avenue, Aurora, Illinois

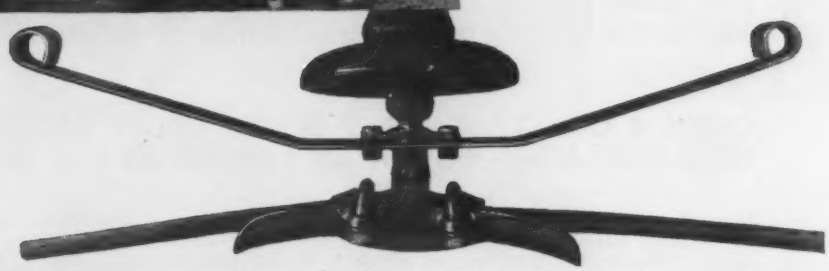
A Complete Line of Switch and Outlet Boxes

ALL-STEEL EQUIPMENT INC.



View of tower on Hoover Power House to Chino Substation 220 kv Line.

IMPORTANT TRANSMISSION LINE USES BTC FORGED STEEL CLAMPS AND FITTINGS



Sold only through your insulator manufacturer.

To bring Hoover Dam power to its large distribution area, the Southern California Edison Co. built its Hoover Power House to Chino Substation transmission lines with connecting lines to Capistrano, Laguna Bell, Barre, and Lighthipe substations. The terrain for the major length of the line is rugged. Conductors used are 605,000 cm., 666,000 cm., and 397,500 cm., A.C.S.R. Length and voltage are: 543 miles, 220 kv.; 35 miles, 115 kv. Construction years were 1937, 1939, 1940 with Stone & Webster Engineering Corporation the construction contractor.

Special Conductor Suspension Clamps, Strain Yoke Sets, Arcing Horns and their supporting Fittings, Miscellaneous Connectors and Tower Fittings used in this important transmission line were drop forged steel produced by B.T.C. Consistently satisfactory performance record is another evidence of sound engineering and good materials for transmission line design.

THE BREWER-TITCHENER CORPORATION, CORTLAND, N. Y.

NOW! ALLIS-CHALMERS

Boosts Ratings...

Read below how the electric utility industry will benefit from the extension and standardization of the AFR line of 5/8% step voltage regulators.

★ Now! Top rating boosted from 750 kva to 2500 kva. Makes the AFR Feeder Voltage Regulator line the broadest on the market!

★ Units 1000 to 2500 Kva standardized for first time. Now, completely automatically controlled, self contained regulators in standard ratings 75 through 2500 kva, voltages through 69 kv.

★ New Lower Prices are now in effect on units 1000 to 2500 kva. The savings that result from standardization of design and manufacture are passed on to you.

★ Also! Easier to specify . . . and order! No special specifications needed. All facts for ordering these standard units — including price — are in the price book.

★ And good news about delivery! Expanded facilities and production standardization speed delivery on *all* AFR regulators.

CHECK 4 QUALITY FEATURES OF THE UTILITY ACCEPTED UNITS NOW REGULATING MORE THAN 5,000,000 KVA OF U. S. POWER

Long life contacts — Generous size increases thermal capacity; special Elkonite RS 1045 — resists pitting, arcing. In addition, contact deterioration is low due to . . .

Quick-break mechanism. Operates on balanced spring principle. Fast moving parts snubbed to quick-standstill after a tap change. Mechanism snaps moving contacts from one position to the next without time to burn or pit.

Heavy-duty driving motor — operates under oil — has no commutator, slip rings, brushes, nor centrifugal switch. Withstands stalled current without injury.

Accessible control—Entire voltage control grouped in single hinged chassis for ready accessibility, quick inspection, and adjustment.

Note: These same features are standard on DFR single phase feeder voltage regulators, sizes to 6900 v, 250 kva.

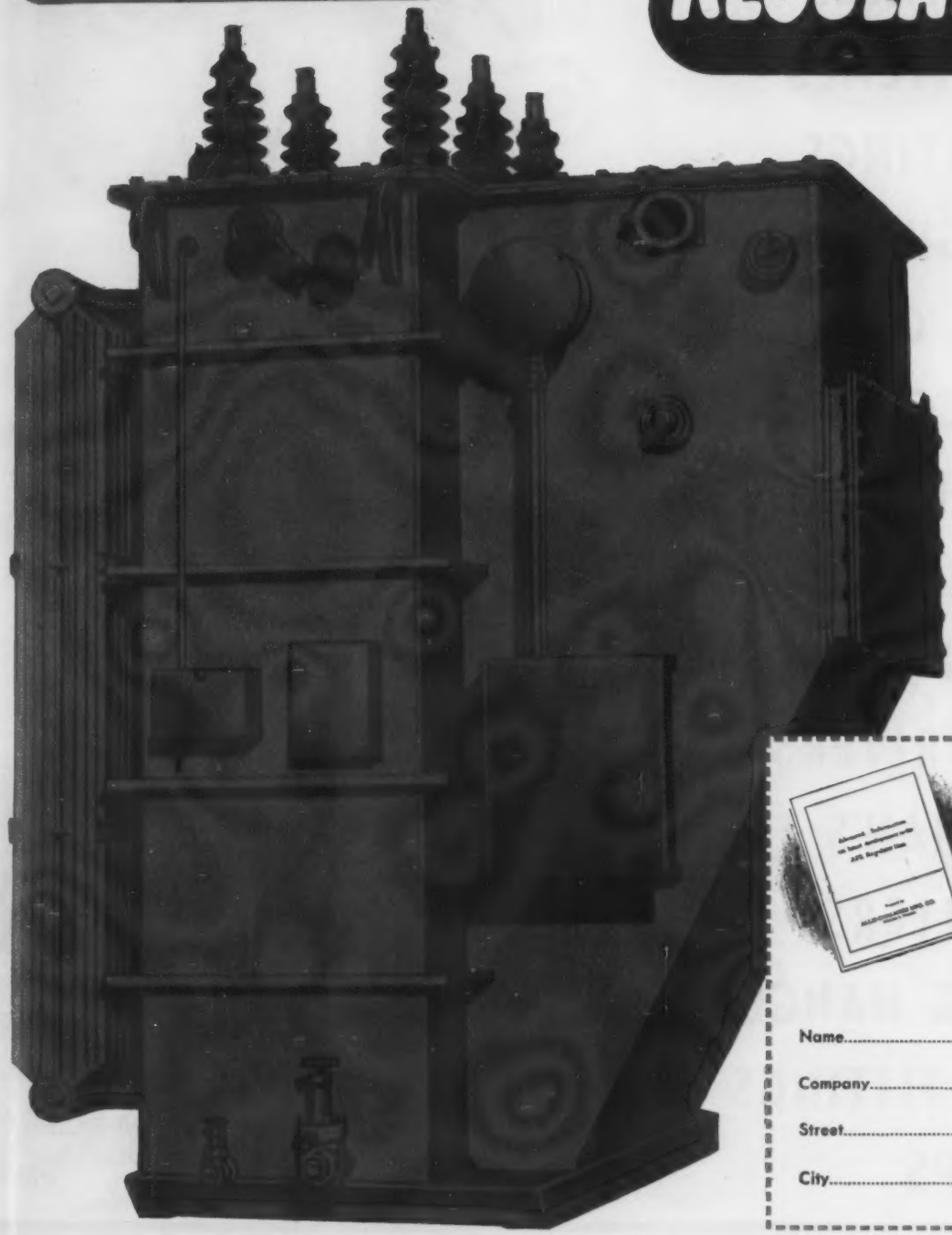
A 2492

ALLIS-CHALMERS

"Originators of the 5/8% Step Regulator!"

Speeds Delivery..

OF AFR 3-PHASE REGULATORS!



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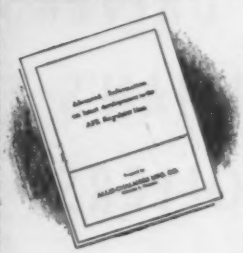

Allis-Chalmers
Milwaukee 1, Wis.

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☐ Have representative call.

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Company.....

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THE COMPLETE LINE FOR Every WIRING SYSTEM

YOU will find the solution to ALL wiring problems . . . from the high line to the last outlet . . . in the AUSTIN LINE. Make the AUSTIN LINE your complete source of supply for material for complete installations—installations designed and made for all types of wiring. Make every electrical job pay—both you and your customer.

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NEW YORK CITY

for schools — stores — offices

High levels of illumination... 100—120—130—or more footcandles... but only a light meter would know it! That is the miracle of Sky-Glo... high levels of illumination without awareness of the fact! Ease of seeing... without awareness of the reason —so restful... unobtrusive... and stimulating is Sky-Glo lighting!

SKY-GLO IS A SYSTEM OF VINYLITE LOUVERS, CHANNELS AND FITTINGS ...that make possible ceilings which glow with light. For rooms old and new. Expensive ceiling alterations are unnecessary as Sky-Glo can be installed below the ceiling, at any point from 8'6" above floor. Vinylite is a product of Bakelite Corp.; has a light transmission factor of 71%.

Sky-Glo cannot be described. You must actually be present in a Sky-Glo illuminated room. Then, only, can you appreciate the statement that Sky-Glo makes possible a new experience in seeing! Then, only, can you *see* what a *difference* there is between a glowing ceiling of light and individually hung light sources.

READY, NOW, is the Sky-Glo "Bulletin SC"... the book that tells why Sky-Glo is one of the most significant developments in fluorescent lighting... in terms of lighting performance ... in terms of installation... application... modernization... maintenance! Mail the coupon for your free copy.

**At 130 footcandles, ceiling brightness is less than 1 candle per sq. in. (452 footlamberts).*

BENJAMIN TRADE MARK
Sky-Glo
LUMINOUS LOUVERED LIGHTING SYSTEM

Distributed Exclusively Through Electrical Wholesalers

BENJAMIN ELECTRIC MFG. CO.
Dept. J, Des Plaines, Illinois

Send, without cost or obligation, copy of Sky-Glo "Bulletin SC", just off the press.

Name.....

Company.....

Address.....

City.....State.....

B-2661 ESS

this LABEL MEANS...

PORCELAIN ENAMEL REFLECTORS ARE ESSENTIAL TO A GOOD LIGHTING PLAN!

1. For fluorescent lighting, as well as incandescent lighting, units bearing the RLM LABEL give assurance of important benefits. For example, this label warrantees that the reflectors are Porcelain Enameled on Steel. That means the reflectors excel in *sustained lighting efficiency, durability, ease of cleaning* and *low-cost maintenance.*

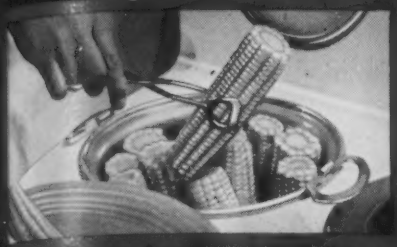
Unlike baked, synthetic or paint enamel finishes, which are chiefly organic, *real Porcelain Enamel* is Vitreous Enamel, *entirely inorganic.* It is a mineral substance, fused to steel at 1550°F. Flint hard and non-porous, it cannot wear, scratch or become dull. It is immune to deterioration, corrosion and weathering. It is the only time-proven, commercially-used light reflecting surface whose original efficiency can be sustained year after year by simply washing with soap and water.

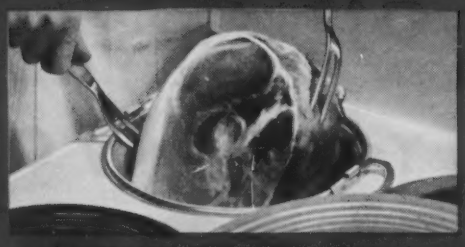
Further, Porcelain Enamel is unsurpassed as a reflecting surface. It ideally combines a high reflection factor with a high diffusion factor. This balance insures a *quality* of light which promotes seeing comfort, high light output with a minimum of glare, and more light for the vertical surfaces as well as the horizontal planes.

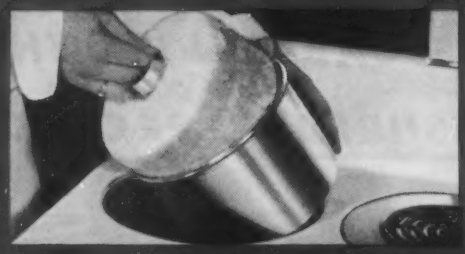
2. The label assures you, too, that the Porcelain Enamel meets important *quality* specifications established by the RLM STANDARDS INSTITUTE. Conformance to these specifications is assured through periodic inspections by the Electrical Testing Laboratories. Thus specification of the RLM LABEL warrantees not only that the reflectors will be of *high quality* Porcelain Enamel, but that this *high quality* will prevail *uniformly* from fixture to fixture.

Photo-micrograph shows how Porcelain Enamel is fused right to the reflector steel.
Fluorescent RLM Specification:
"Reflector steel thickness: not less than .032 inches."
ASSURES RIGIDITY
Fluorescent RLM Specification:
"Porcelain enamel no thicker than .025 inches."
ASSURES CHIP-RESISTANCE
Fluorescent RLM Specification:
"Mean reflection factor: 79%."
ASSURES EFFICIENCY
Fluorescent RLM Specification:
"Surface must be free from tears, star marks, crazing, blisters, black specks, hair lines, chipping, pin holes and other irregularities."
ASSURES DURABILITY
R2-31

Porcelain Enamel is just one of the important specifications which lighting units must meet in order to carry the* RLM LABEL.** ***It is one more intelligent reason why you should buy, specify and install fluorescent fixtures bearing the* RLM LABEL . . . *your Warranty for Uniform Quality. For details concerning standard specifications established for 14 different fluorescent and incandescent lighting units, as well as a list of manufacturers making them, write to the* RLM STANDARDS INSTITUTE, *Suite 815, 326 West Madison Street, Chicago 6, Illinois.







THE MONARCH "DEEP-HEET" COOKER IS

DIFFERENT

because it has

MOST electric cookers have *bottom* heat only. And there's a big difference. The Monarch "Deep-Heet" Cooker is virtually a surface oven. It bakes, not stews. Foods do not stick to bottom. Gravies are always golden brown. Meats fall off the bone. Even cakes are delicious (see above). If you sell Monarch Electric Ranges, *talk* these things—sell foods, meals, better cooking, easier cooking, economy. Be specific. Use Monarch literature, sales charts and the cook book to point out how the Monarch Electric with its exclusive "Deep-Heet" Cooker will make Mrs. Customer a *better cook.*

MONARCH MALLEABLE RANGE CO., 3968 Lake St., Beaver Dam, Wis.

Monarch
ELECTRIC

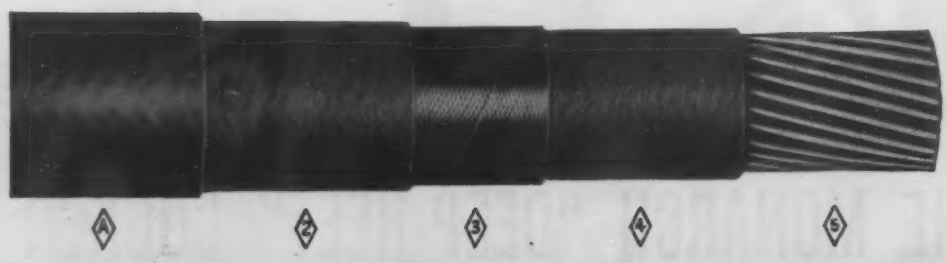
Standard "Deep-heet" equipment on Models F56P and F156P.

Put Your Money On

ROCKBESTOS A.V.C.

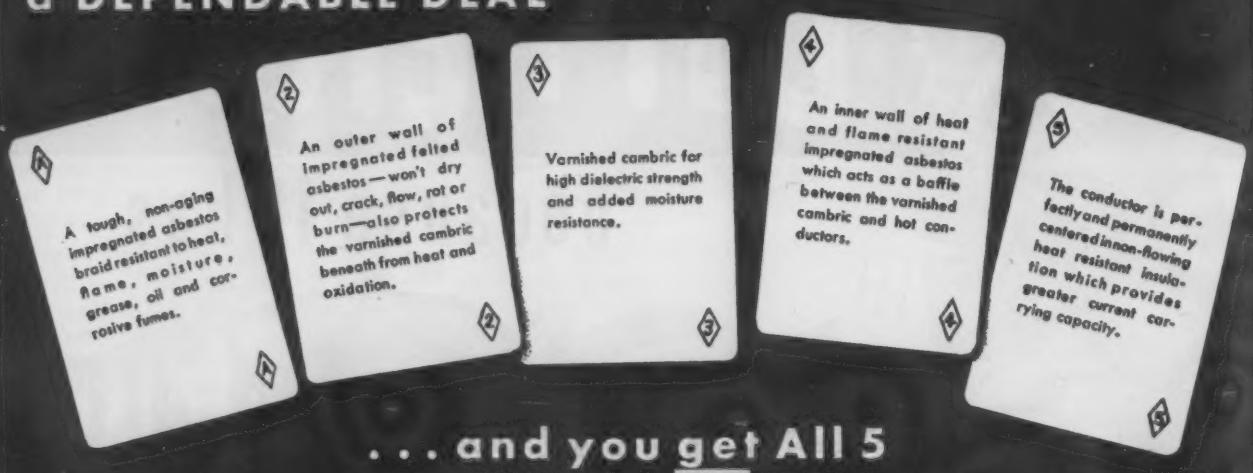
THE CABLE WITH THE

PRE-ASSURED Hot Spot 1 PROTECTION



Rockbestos A.V.C. 600 Volt Power Cable—Code Type AVA—will operate continuously under temperatures up to 230° F. This cable and similar types ranging up to 5000 volts *pre-assure* trouble-free performance in hot locations . . . because of the unique 5-point Rockbestos A.V.C. construction.

You Need All 5 to Make Every Cable Purchase a DEPENDABLE DEAL


1
A tough, non-aging impregnated asbestos braid resistant to heat, flame, moisture, grease, oil and corrosive fumes.
2
An outer wall of impregnated felted asbestos—won't dry out, crack, flow, rot or burn—also protects the varnished cambric beneath from heat and oxidation.
3
Varnished cambric for high dielectric strength and added moisture resistance.
4
An inner wall of heat and flame resistant impregnated asbestos which acts as a baffle between the varnished cambric and hot conductors.
5
The conductor is perfectly and permanently centered in non-flowing heat resistant insulation which provides greater current carrying capacity.

. . . and you get All 5 with ROCKBESTOS A. V. C.

Here's the cable that's permanently insulated with impregnated felted asbestos: the insulation that won't lose resilience, bake brittle, crack, dry out, swell, flow, rot or burn—under even the toughest conditions.

This is the built-in Rockbestos A.V.C. protection that gives your installations years of trouble-free performance . . . that takes constant high temperatures up to 230° F. . . . and that withstands severe heating and cooling cycles, fumes, oil and grease—*without failure.*

Engineered for the most exacting installations, Rockbestos A.V.C. wires and cables are available in 600 to 5000 volt ratings—single or multi-conductor—with asbestos braid, lead sheath, armor or lead and armor. Also Type AVA Boiler Room Wire, Multi-Conductor Control Cables, Type AVB Switchboard Wires and Type AIA Wires and Cables.

Get your copy of the new No. 10-F Rockbestos Catalog, sectioned for easy reference—write now.

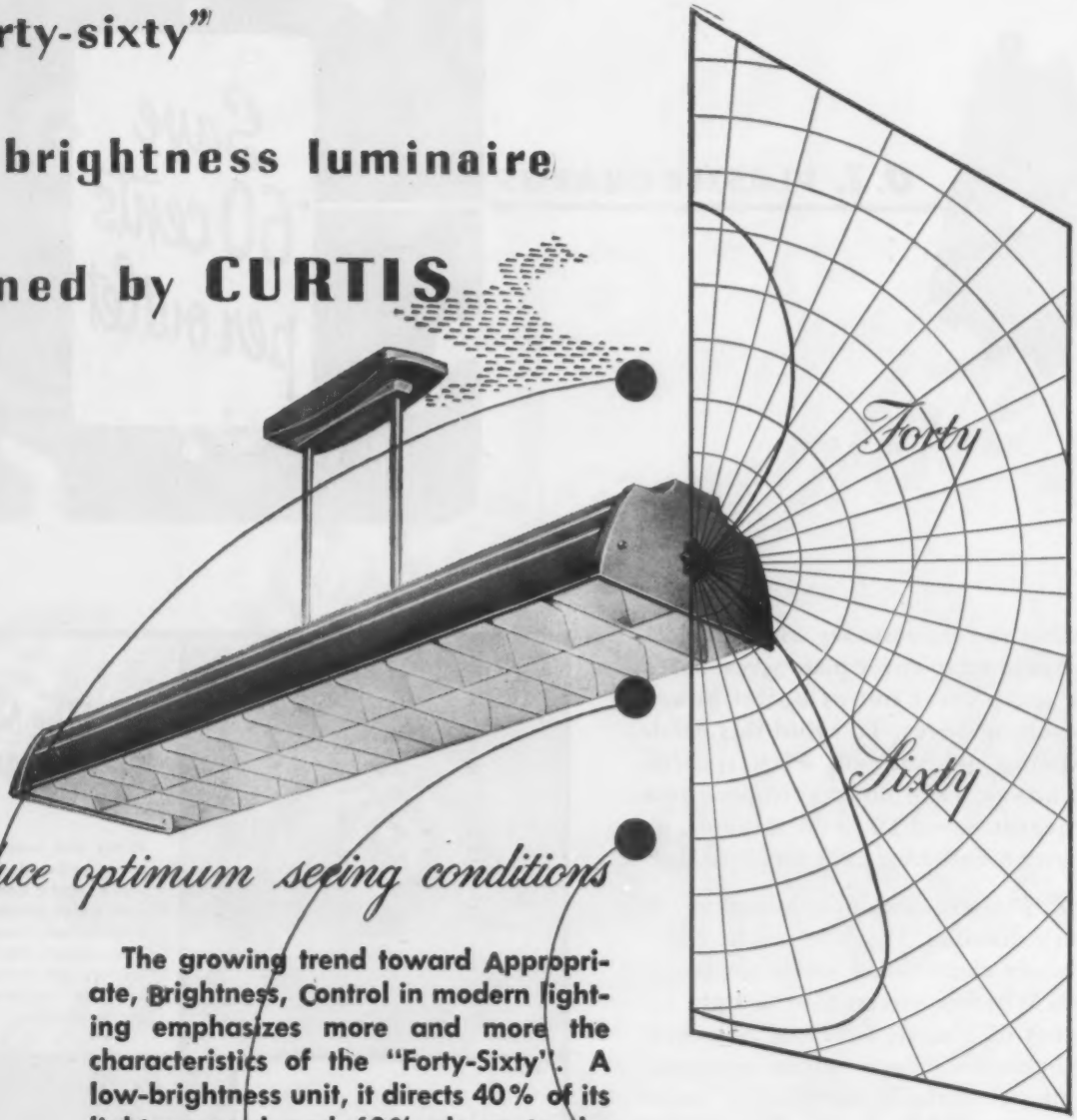
Rockbestos Products Corp., 234 Nicoll St., New Haven 4, Conn.
Office and Warehouse, Oakland Municipal Airport, Oakland, Cal.; Los Angeles District Office, 6919 San Fernando Rd., Glendale, Cal.

ROCKBESTOS A.V.C. — *The Wire with Permanent Insulation*

the "forty-sixty"

a low brightness luminaire

designed by CURTIS



to produce optimum seeing conditions

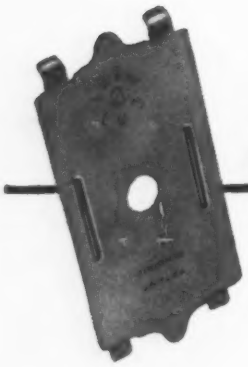
The growing trend toward Appropriate, Brightness, Control in modern lighting emphasizes more and more the characteristics of the "Forty-Sixty". A low-brightness unit, it directs 40% of its light upward and 60% down to the working plane. Shielded 35° crosswise and 25° lengthwise, this Alzak Aluminum unit is both easily installed and maintained.

Capitalize on the need for ABC lighting . . . get full details about this luminaire.

A ppropriate B rightness C ontrol

NEMA

CURTIS LIGHTING, INC.
6135 WEST 65th STREET, CHICAGO 38, ILLINOIS
CHICAGO . . TORONTO . . NEW YORK



O. Z. PLASTERGUARDS

It's costing you extra money when an electrician has to retap cover plate screw holes and scrape plaster out of outlet boxes before pulling wires. To avoid this needless expense use snap-on Plasterguards for all boxes. One contractor reports Plasterguards saved 15 to 30 minutes, or 60¢ to over a dollar for each box installed.

The O.Z. Plasterguard, now available for large scale distribution, keeps plaster out—keeps boxes clean when walls are being finished. Whether covered by a light or heavy coat of plaster, lime reaction with the steel causes a brown outline to appear on the plaster surface, immediately locating the concealed box. No time is lost searching for hidden boxes.

Easily installed in less than a second, the Plasterguard is held snugly against the cover plate by four spring ears. To remove, simply press Plasterguard into box and take out, leaving the plaster edges neat and uncracked.

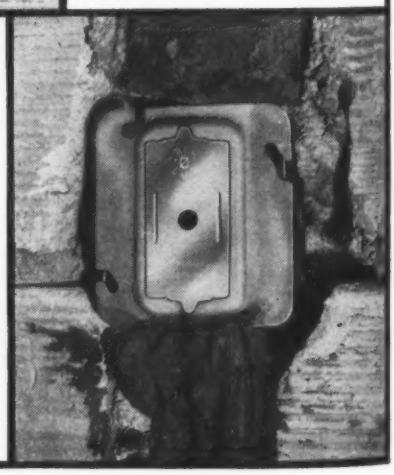
Write O.Z. today for more information on this money-saving appliance, a list of prices and volume discounts.

The old way

to try and keep plaster out. Note exposed cover plate screw holes and open box into which plaster will enter and harden. Now, instead of newspaper, electrical contractors are saving cleaning time by snapping in O.Z. Plasterguards.

The new way

With the Plasterguard in place there is no chance of plaster caking up inside the box or filling screw holes. To remove, push *into* box and take out. Result — uncracked plaster edges and clean screw holes. Plasterguards may be straightened and reused.



O.Z. ELECTRICAL MANUFACTURING COMPANY

262 BOND STREET · BROOKLYN 2, N. Y.

THEY'RE O. K. IF THEY'RE O. Z.

CONDUIT FITTINGS • CABLE TERMINATORS
CAST IRON BOXES • SOLDERLESS CONNECTORS
GROUNDING DEVICES • POWER CONNECTORS

4247

The first completely new watthour meter in 50 years

GENERAL ELECTRIC

For the first time in

MAGNETIC SUSPENSION HAS BEEN SUCCESSFULLY APPLIED TO THE PRODUCTION OF A MOVING ELEMENT WITHOUT BEARINGS

"Give us a lifetime bearing system, and you will greatly reduce the cost of meter maintenance." For years, cost-conscious meter men have made this request. And, now at last, their plea has been more than met by *magnetic suspension of the moving element* in the revolutionary new General Electric Type I-50 Watthour Meter.

MOVING SYSTEM "FLOATS"—WITHOUT BEARINGS

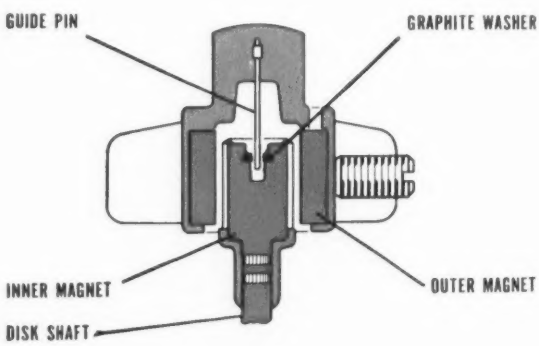
Essentially, magnetic suspension consists of two concentric magnets of cunico, a high-coercive material. The outer magnet is attached to the frame. The inner magnet is an integral part of the disk and shaft assembly. The interaction of the two magnetic fields supports the moving system in a state of equilibrium.

Vertical alignment is maintained by two stainless steel guide pins—one at the top and one at the bottom. They are centered by graphite washers, and require no lubrication.

FRICTION IS MINIMIZED

The only bearing pressure in the I-50 is that due to side thrust on the guide pins. These forces have been greatly minimized by locating the damping magnets close to the electromagnet. Pressure never exceeds 100 pounds per square inch. In the conventional design, pressure on the bearings is 100 tons per square inch . . . or 2,000 times as great.

This outstanding technical achievement is the result of foresight and ingenuity coupled with all the engineering skill and manufacturing experience gained during the past fifty years. Yet, it is only one of the many new features incorporated in the I-50 meter.

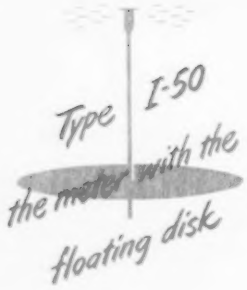


TYPE I-50 IS A COMPLETELY NEW METER

It is daring in concept, yet technically sound in every detail. It is a meter of completely new design, embracing new materials, new techniques, and ingenious methods of fabrication. The result is a watthour meter with longer life, greatly improved performance, and lower maintenance costs.

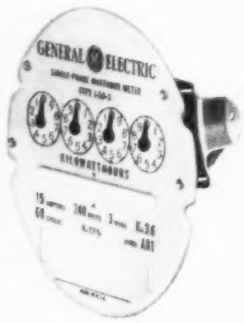
WATTHOUR METER HISTORY

GENERAL ELECTRIC

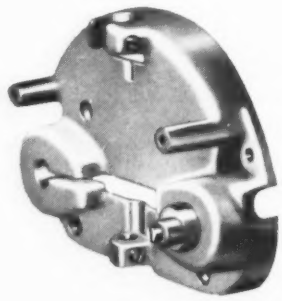


NO OTHER METER

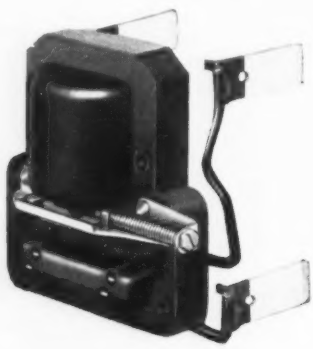
has ever combined so many desirable features . . .



REGISTERS OF UNIT CONSTRUCTION for easier reading and longer life. Stainless-steel pins in aluminum bearings assure low friction and accuracy in this simple, rigid, mechanism.



DAMPING MAGNETS DIE CAST IN POSITION assure permanent alignment of parts, and improved surge resistance. Side thrust and line-frequency vibration are greatly reduced.



ELECTROMAGNET CURRENT COILS MOLDED in butyl rubber, and plastic enclosed potential coils, provide long life and greater calibration stability.

ONE-PIECE UNIT-MOLDED BASE minimizes corrosion. Co-ordinated insulation keeps surge currents out of the electromagnet and meter frame.

All these features—and more—make the I-50, both in the socket- and front-connected types, a completely new watthour meter. Its production will, for the time being, supplement that of our regular I-30 meter. This will result in an over-all production increase of about 15% for 1948. Get more details on the I-50 by contacting your nearest G-E representative. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

601-25

IF BURNOUTS SHOULD OCCUR—

Transite Ducts will not spread Smoke or Fumes

These incombustible Transite Ducts will provide greater safety if burnouts should occur.

. . . because TRANSITE is inorganic—incombustible!

Two great hazards . . . smoke and fumes . . . are less dangerous when you specify Transite Ducts for underground cableways. Made of asbestos and cement, Transite is inorganic and incombustible. It will not support flame, or contribute gases to a possible manhole explosion if burnouts should occur.

In addition to this vital safety factor, Transite Ducts offer these four other important advantages:

1. Easy to Install—Transite Ducts come in long, light lengths that are easy and economical to assemble and install.

2. Corrosion-Resistant—Transite is inorganic—cannot be affected by corrosive soils. It is made of asbestos and cement combined under great pressure into a permanently strong structure.

3. Immune to Electrolysis—Entirely inorganic and non-metallic, Transite Ducts are not affected by electrolysis or galvanic action.

4. Permanently Smooth Bore—Long cable pulls and replacements are easy with Johns-Manville Transite Ducts. And this smooth bore minimizes damage to cables.

For further information on how Transite Ducts can *increase the safety* and *cut the costs* of Cableway systems, write to Johns-Manville, Box 290, New York 16, New York.

JOHNS MANVILLE JM PRODUCTS

Johns-Manville

TRANSITE DUCTS

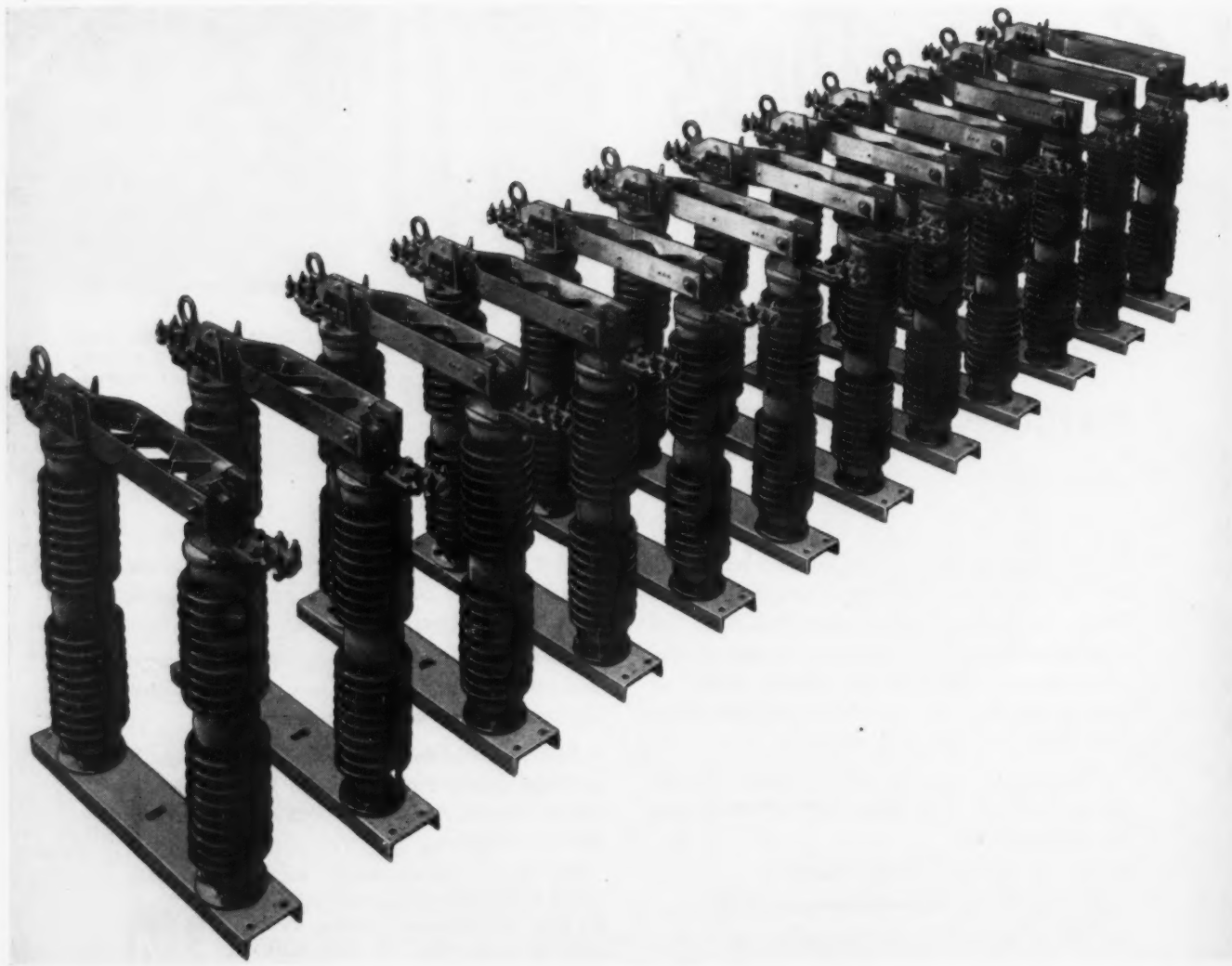
CONDUIT for use without concrete

KORDUCT for concreting in

Cole Electric Co.

8439 Steller Drive Culver City, Calif

TExas 0-4701



OUTDOOR HOOK STICK DISCONNECTING SWITCH
69000 Volts—1200 Amperes
Type YU-2 (Special Insulators)
Single Pole Single Throw
Bulletin 20A.

...A NOTEWORTHY TIP

INTER-OFFICE MEMO

TO: Purchasing Dept.

FROM: Engineering Dept.

Records continue to show RUST costs us more than Copperweld.

Recommend buying Copperweld Guy and Messenger strand exclusively.

W.B.

Copperweld

TRADE MARK

NON-RUSTING

GUY AND MESSENGER STRAND

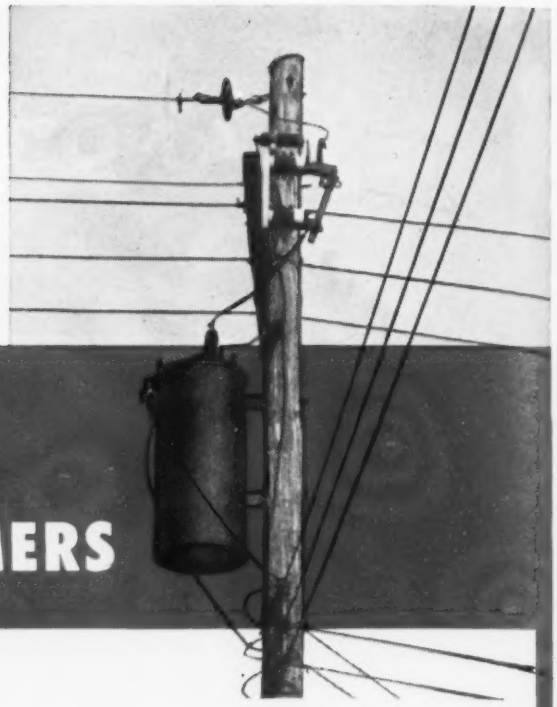
COPPERWELD STEEL COMPANY

GLASSPORT, PA.

SALES OFFICES IN PRINCIPAL CITIES

PACIFIC COAST OFFICE: MONADNOCK BUILDING, SAN FRANCISCO

SAVE TIME
SAVE EXPENSE
SAVE WORRY
CHOOSE



Wagner
POLE-TYPE TRANSFORMERS

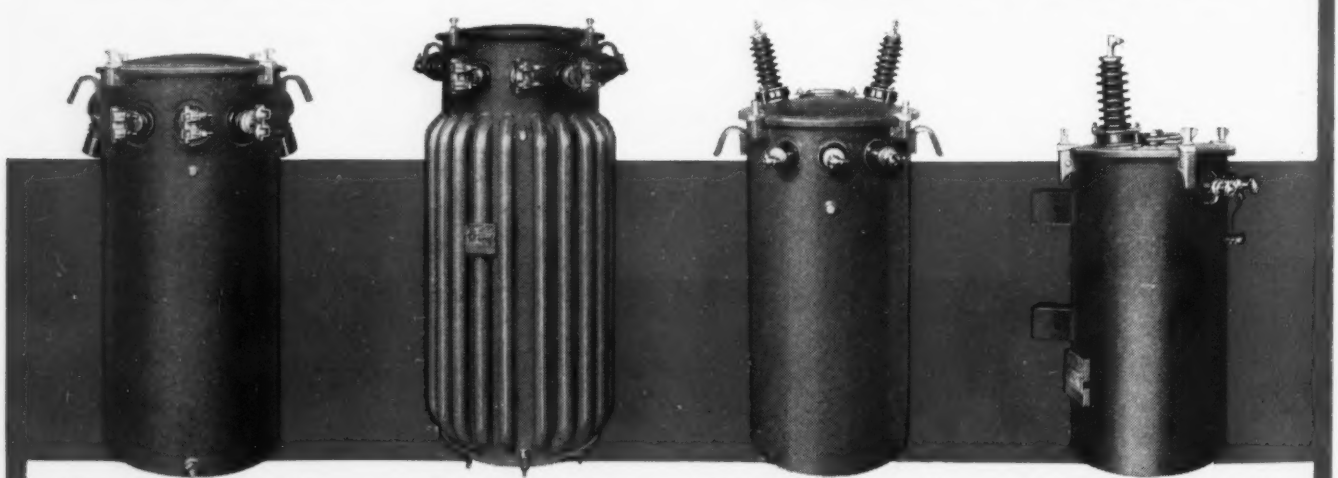
Wagner pole-type distribution transformers assure considerable savings in operation and maintenance because of their improved design, high-quality construction, ease of installation, and high efficiency. They are designed for the utmost facility in handling, operating, and maintaining.

These distribution transformers are standardized for your convenience both internally and externally. The four types illustrated show the external variations. (EEI-NEMA standards are incorporated in 60-cycle, pole-type transformers rated 100 kva and below, high voltage 15,000 volts and below, low voltage 600 volts and below).

Wagner Distribution Transformers are widely known for their excellent performance records, and uphold the Wagner reputation for dependability earned during a half century of designing and building distribution and power transformers.

Whatever your transformer requirements may be, Wagner can furnish the exact type of transformer to fit your need. Wagner has a nationwide organization to provide fast, convenient service, with twenty-nine branches located in principal cities ready to help you with your transformer problems. Bulletins TU-180 and TU-181 give complete information on Wagner Transformers.

Wagner Electric Corporation
6381 PLYMOUTH AVE., ST. LOUIS 14, MO., U. S. A.



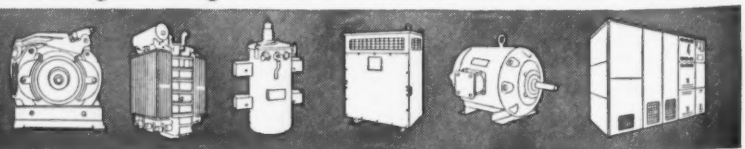
Type HEX: Equipped with high-voltage pocket bushings. 15000 volts and below, 1½ to 100 kva.

Type HEB: Equipped with sidewall stud-type high- and low-voltage bushings. Standard voltages up to 5000, 1½ to 100 kva.

Type HEK: Equipped with two high-voltage cover bushings and three low-voltage tank-wall bushings. Voltages of 5001 to 15000, 1½ to 100 kva.

Type HEF: Equipped with one high-voltage cover-bushing and from one to three low-voltage tank-wall bushings. Standard ratings through the 25 kva size in the 7200/12470Y and 7620/13200Y volt classes.

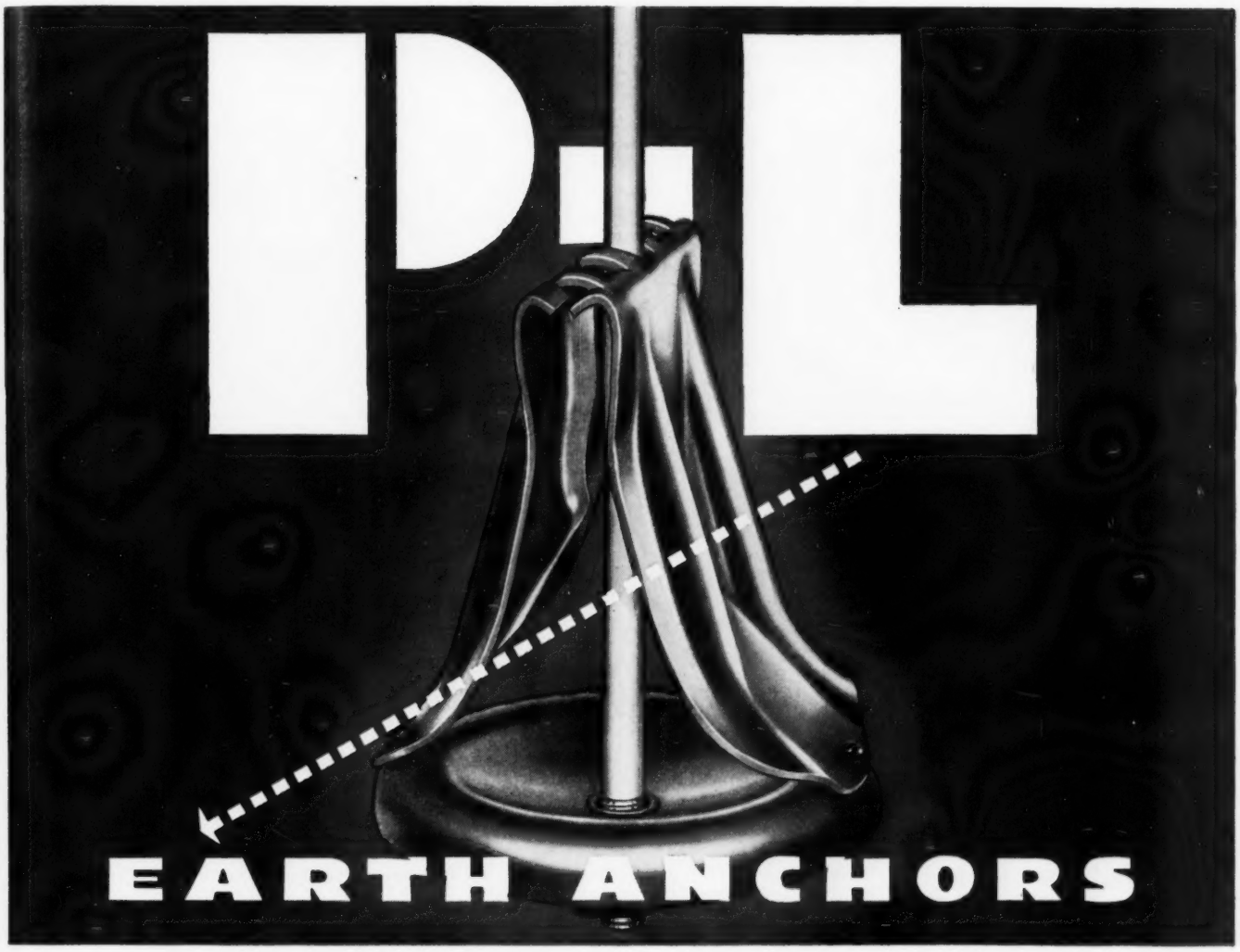
Consult Wagner Engineers on All Transformer Problems



BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

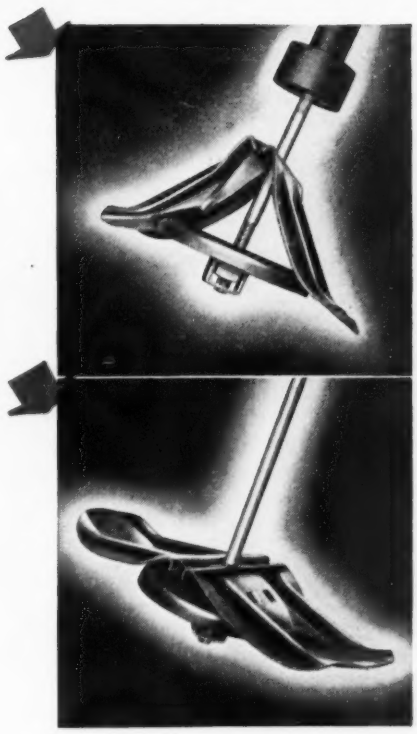
ELECTRICAL AND AUTOMOTIVE PRODUCTS

T48-9



REA APPROVED—ANCHORS COVERED BY PATENTS GRANTED AND PENDING.

P-L ALL STEEL, EXPANDING TYPE EARTH ANCHORS combine real holding power with ease of installation. Cut-out sections at top of blades permit the anchors to open so easily that only a few blows of the tamping bar are required. When fully open, shoulders on blades firmly position blades to base plate creating a stabilized unit. Easily expanded by tamping, the sharp edges cut a path so that the blades spread, through a natural arc, deeply and *permanently* into solid undisturbed earth. Rounded blade edges automatically position direction of blade around rocks and obstructions. Built of two simple pieces of heavy steel plates . . . there are no arms, joints, or multiple pieces to bind or get out of order.

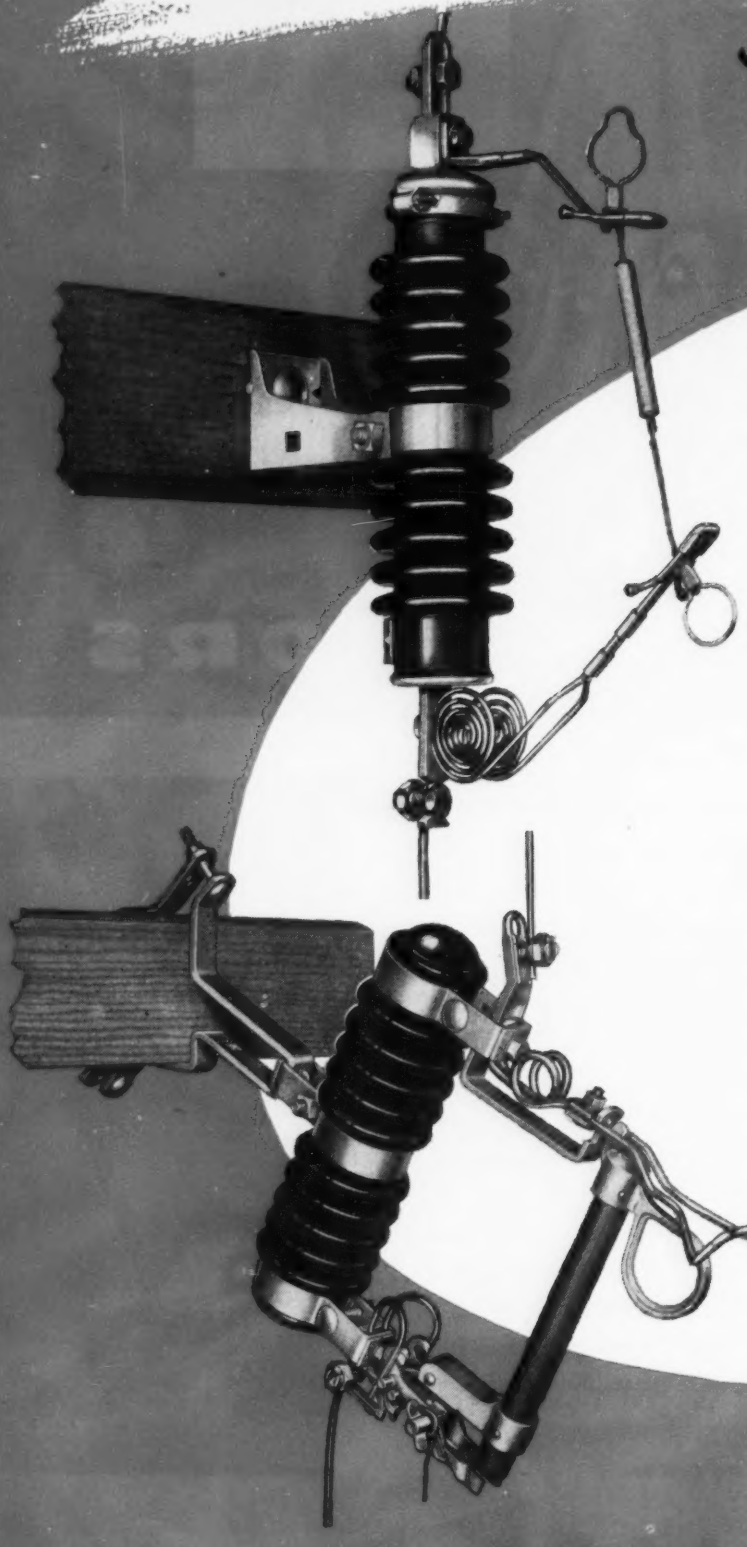


Shear bolts fasten blades integrally to base plate. P-L anchors come to you as assembled units . . . fabricated of hardened steel, with deep rib, truss type blades, which resist bending. Installation is facilitated by the fact that the tamping force is exerted directly onto sharp-edged blades. Reinforced assembly hole strengthens the heavy base plate. Nut retainer permits salvaging of rod.

Write for descriptive literature and prices.

PIEPER-LILLARD, INCORPORATED
SAINT LOUIS 1, MISSOURI

—The Years of



TRIP-O-LINK
13-Years' Service

Simplicity marks this outstanding design. Three castings, five bolts, two contacts, two connectors and a one-piece hanger make a Trip-O-Link capable of rupturing thousands of amperes easily and efficiently.

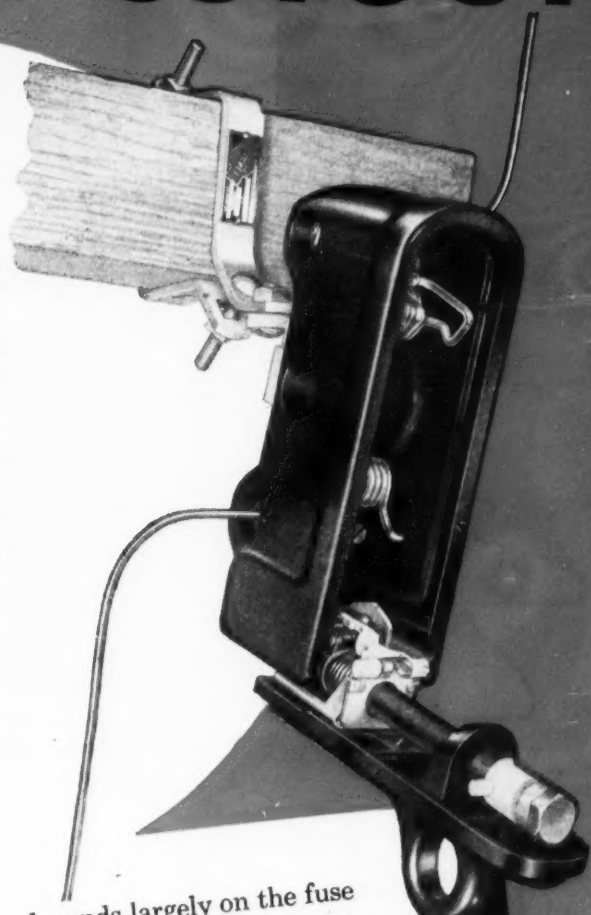
Originally designed for 7,200 volt rural lines, the Trip-O-Link line has been expanded to include substation and feeder protection up to and including 69,000 volts and 100 amperes.

TRIPOUT
15 Years' Service

Several million switch-years of service testify as to the unfailing and continuing capacity of the Tripout. It is noted especially for its high rupturing capacity derived from a combination of two features, the Kearnite fibre fuse tube and the open upper end fuse cartridge.

Year after year this line has been improved so that now you may choose the Tripout for tough assignments in ratings through 69,000 volts and 200 amperes.

Prove the Value
KEARNEY CUTOUTS



TRIP O MATIC
14 Years' Service

During the fourteen years since the original design was introduced, there have been twenty-one distinct improvements made in the Trip O Matic. Being the first to introduce a product is only part of being a good supplier; modernizing and improving the original is the true test of the progressiveness of the manufacturer. Try Trip O Matics on your next order to see what advantages these up-to-the-minute cutouts can bring. They are available in 5,000 and 7,500 volts, 50 and 100 ampere ratings.

Good cutout performance depends largely on the fuse links used. Kearney offers the widest possible choice of fast, medium and slow fuse links designed for use in all makes of modern cutouts. Get the maximum protective performance from your cutouts by choosing from the complete line of Kearney fuse links.

FOR BETTER CONSTRUCTION AND MAINTENANCE

Always Specify **KEARNEY PRODUCTS** *for the Job*

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

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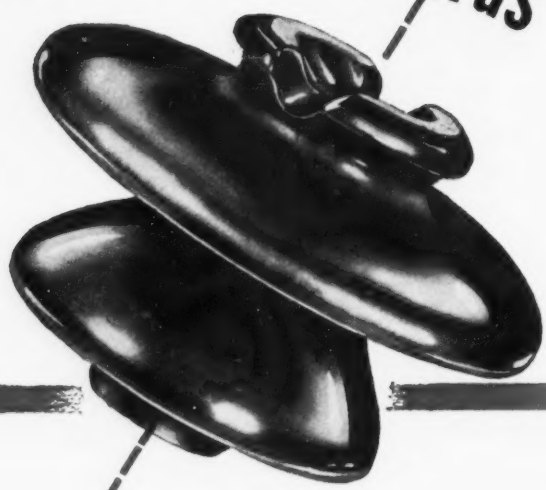
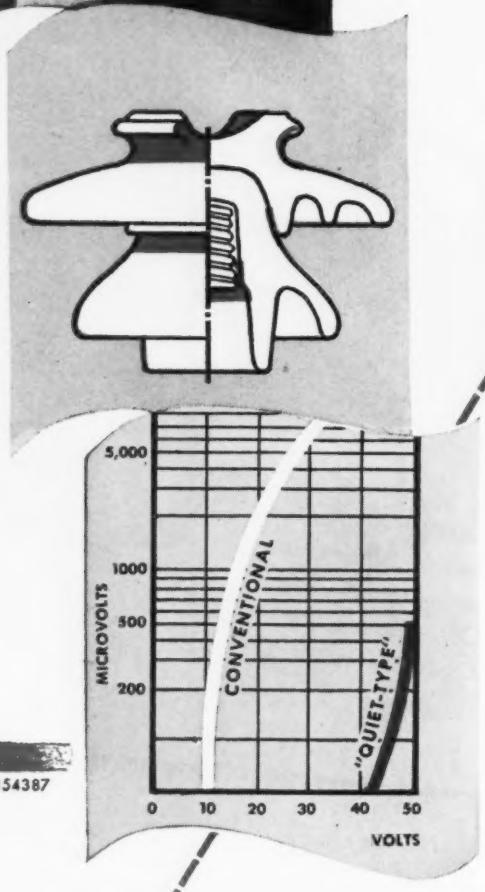
Canadian Plant, James R. Kearney Corp., Ltd., Leaside, Ontario, Canada

West Coast Distributor: **MAYDWELL and HARTZELL,** INC.

THOMAS "QUIET-TYPE" INSULATORS set tomorrow's standards





*Patent No. 2154387

● Typical Thomas advancement, is our complete line of *patented "Quiet-Type" Insulators. Record acceptance by the industry, proves these radio noise-free pin types are setting tomorrow's standards. It's not surprising . . . for they eliminate all insulator radio-interference.

Thomas engineers pioneered and were first to develop the under-glaze metallic oxide coating—applied to the areas indicated by red in the center sketch. The result is a barely discernible coating—contamination free because it's *under the glaze.* Sprayed on before firing (top sketch) it becomes a permanent part of the porcelain—can't come off and guarantees positive noise-free operation without sacrificing any insulating qualities.

Line and laboratory tests prove the superiority of these insulators over conventional types. As you see on the bottom graph, it takes four times as much voltage to produce noise-making microvolts with the Thomas "Quiet-Type" design.

In terms of customer goodwill your Thomas "Q-T" Insulators earn their slight additional cost many times over.

Write for free illustrated brochure describing these modern "Q-T" Insulators.

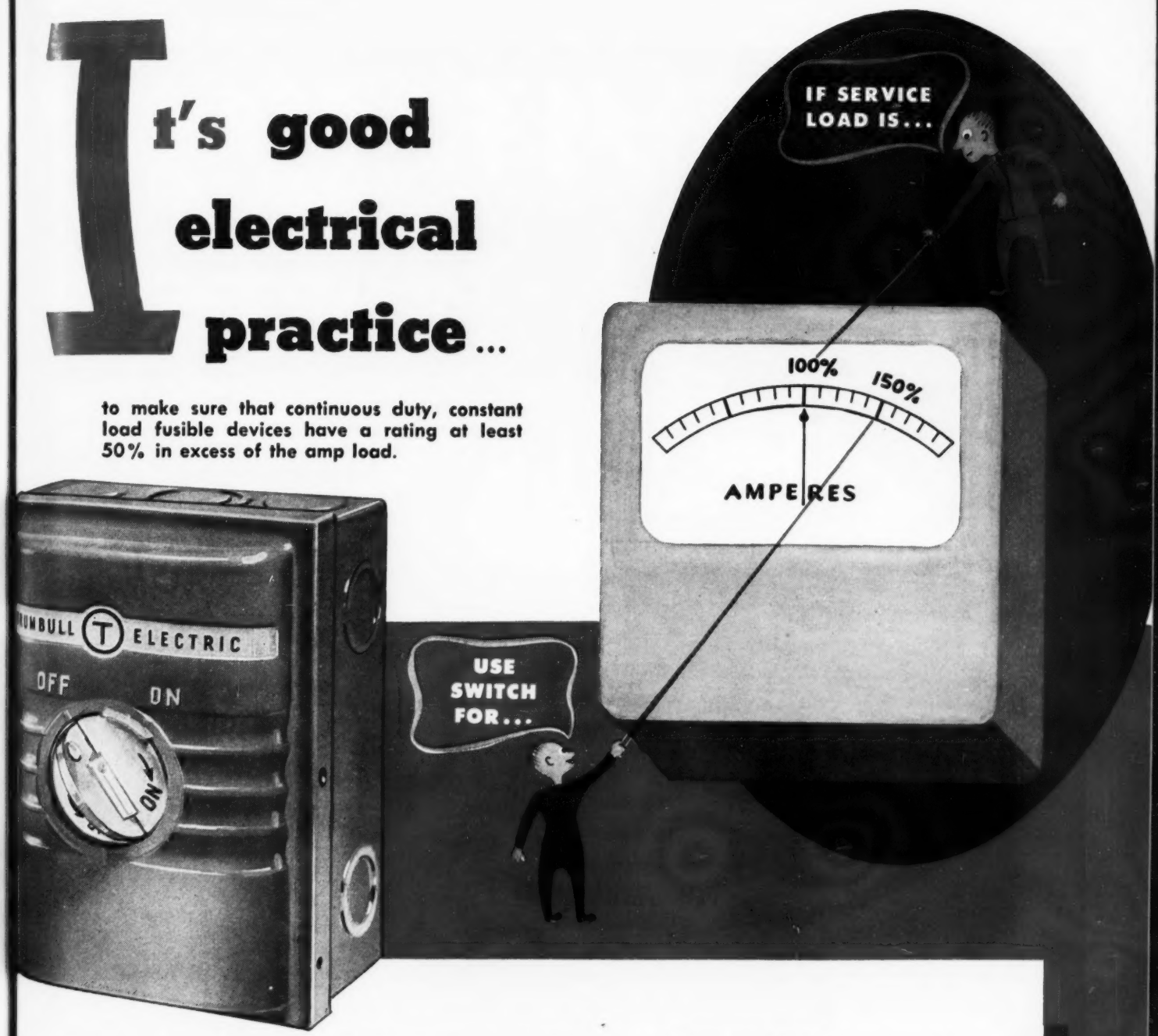
1873 THOMAS INSULATORS our 75th year RELIABILITY 1948

The R. Thomas and Sons Co.

LISBON, OHIO
NEW YORK CHICAGO
AGENTS IN PRINCIPAL CITIES

It's good electrical practice...

to make sure that continuous duty, constant load fusible devices have a rating at least 50% in excess of the amp load.



It's good Electrical Practice

... to use a Trumbull Type D Enclosed Safety Switch for entrance service and general purposes. Its 30 amp capacity is more than adequate for such duties as controlling small motors.

Front operated, the Trumbull Type D switch has a sturdy, *"KING-SIZE" HANDLE* . . . more than *AMPLE WIRING SPACE* . . . double break, *SILVER TO SILVER CONTACTS* under heavy pressure . . . contacts fully enclosed for protection of operators, and holes provided for sealing by power company. With its modern streamlined design, the Type D is the switch of tomorrow — *today.*

Safety switches or switchboards, motor controls or control centers, branch circuit distribution systems or main feeders . . . it's always good electrical practice to specify Trumbull, the name that safeguards *your* safe practice. THE TRUMBULL ELECTRIC MANUFACTURING CO., Plainville, Conn. Other factories and offices throughout the United States. Foreign representation.

MEN WHO OBSERVE THE BEST PRACTICES MAKE IT A PRACTICE TO USE **TRUMBULL**

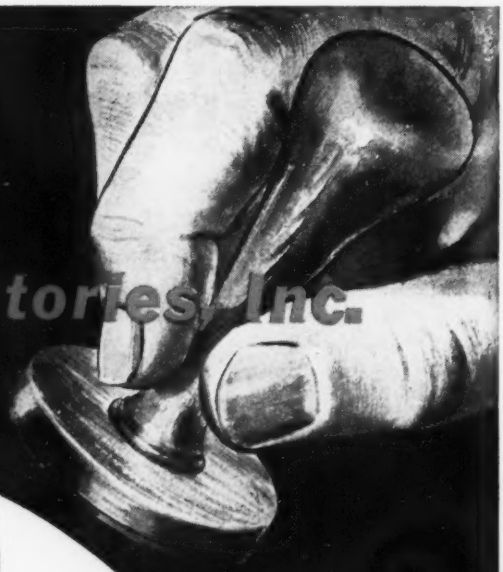
TRUMBULL (T) ELECTRIC

SERVIT

listed by

Underwriters' Laboratories, Inc.

(SIZES #8 THROUGH 4/0)



This universal favorite for taps, dead ends, service entrances, motor leads, etc., is now UL listed for the sizes indicated . . . and each size is listed for all practical combinations of cable sizes. In addition, SERVIT'S compactness, its high compressional strength, and its rounded, easily taped edges . . . all contribute to its outstanding leadership. For an efficient, approved connection, be sure to connect with Burndy.

Connect with

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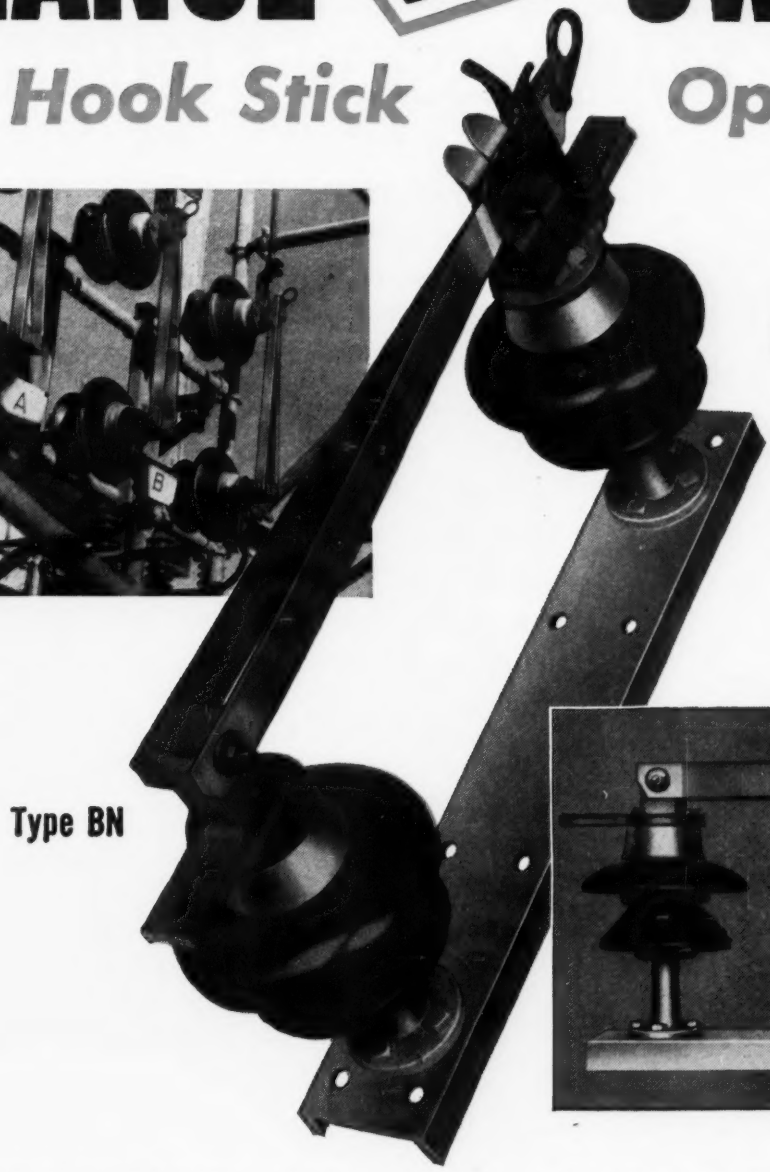
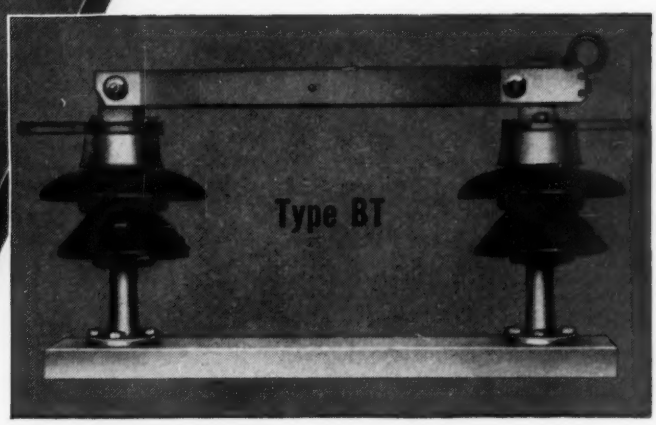
CHANCE Type BN-BT Switches*

Hook Stick Operated



Type BN



For all types of Single Pole Installations

400 to 2000 Amp.
7.5 to 161 Kv.

Chance Hook Stick Operated Disconnecting Switches are made in a complete range of capacities in all voltages up to and including 161 Kv. They are available in single or double throw types for horizontal mountings—upright or underhung, and for vertical mounting up to 115 Kv.

● Sturdy Construction . . . High Conductivity
Chance BN and BT switches are ruggedly built throughout. Trussed blades add rigidity. All current carrying parts are constructed of high conductivity copper.

● Positive Blade Latches
Spring latches secure the blades in the contact clips and prevent opening under short circuits.

● Self-Aligning Clips
Contact clips on the BN switch are of the spring type which make positive contact even though blade may be slightly out of line. Tapered tongue on BT type guides blade to proper position—contact pressure is adjustable.

● Long Life Contacts
Silver surfaced area contacts are provided for long life.

* CHANCE SWITCHES (FORMERLY BOWIE) ARE BACKED BY 42 YEARS OF SWITCH ENGINEERING AND MANUFACTURING EXPERIENCE.

A·B·CHANCE CO·

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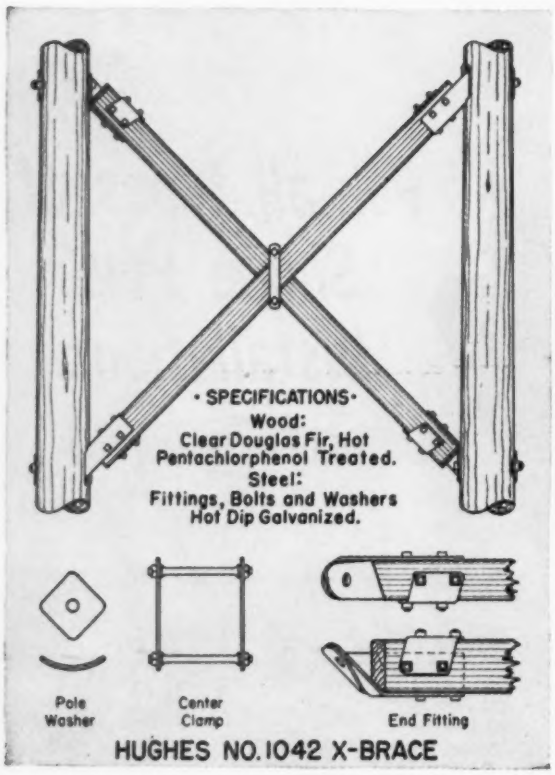
ABC INDUSTRIES

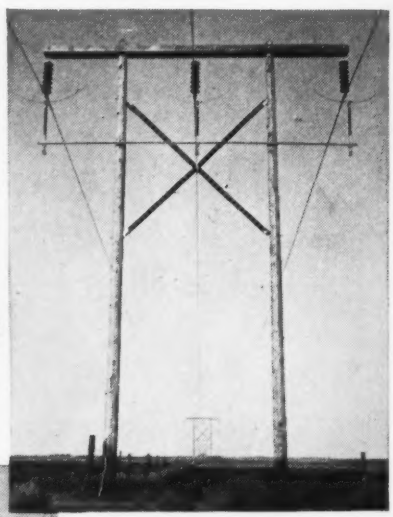
HUGHES *Wood X-Braces* FOR TRANSMISSION STRUCTURES

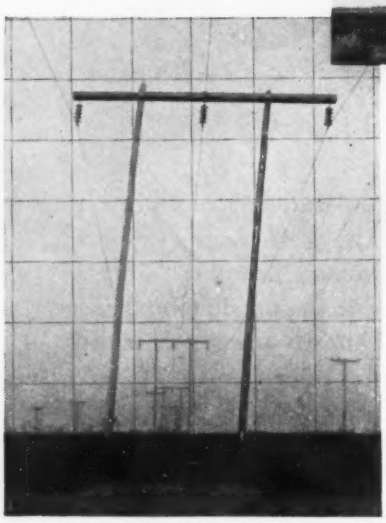


HUGHES NO. 1042 X-BRACE

HUGHES Wood X-Braces have made possible the desire of Design Engineers for an economical, structurally sound transmission line. HUGHES X-Braces combine the economical features of wood poles and arms with structural advantages found earlier only in steel towers.

Illustrated below are two contrasting structures, the braced structure with longer spans required no maintenance whereas the unbraced structure usually required continual attention.


AFTER 11 YEARS IN HEAVY LOADING DISTRICT


AFTER 10 YEARS IN LIGHT LOADING DISTRICT

Many Transmission and Operating Engineers are rehabilitating existing lines and increasing safety factors by installing X-Braces to existing constructions; thus extending the life of the line.

For your individual requirements, consult HUGHES Engineering Department.

HUGHES BROTHERS
SEWARD, NEBRASKA
FOUNDED · 1921
INCORPORATED
"HUGHES" TRANSMISSION & DISTRIBUTION MATERIAL MFRS. WOOD METAL

You're sure of..

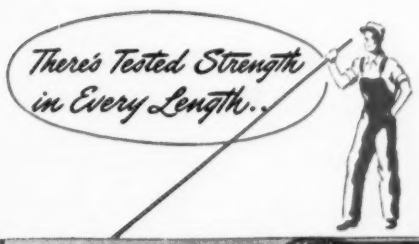
FAST MAKE-UP ...with

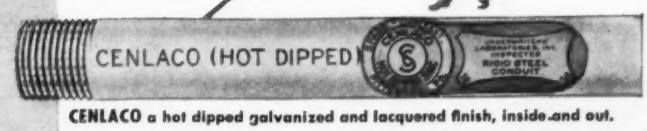
CENTRAL SPANG CONDUIT

● Many contractors say that the threads on Central Conduit and Couplings help them save time. These threads are cut on automatic machines—then checked by careful inspectors to be sure the lead, taper and depth are correct. The results are smooth running threads that assure fast make-up and safe, tight joints.

Central Rigid Steel Conduit meets all the requirements of the National Electrical Code—and every length bears the seal of the Underwriters' Laboratories, Inc.

There is a Central Conduit distributor near you. In spite of existing shortages he will do everything possible to fill your order.





CENLACO a hot dipped galvanized and lacquered finish, inside and out.

CENTRAL WHITE electro-galvanized outside and black enameled inside.

CENTRAL BLACK permanent, baked-on black enamel finish, inside and out.

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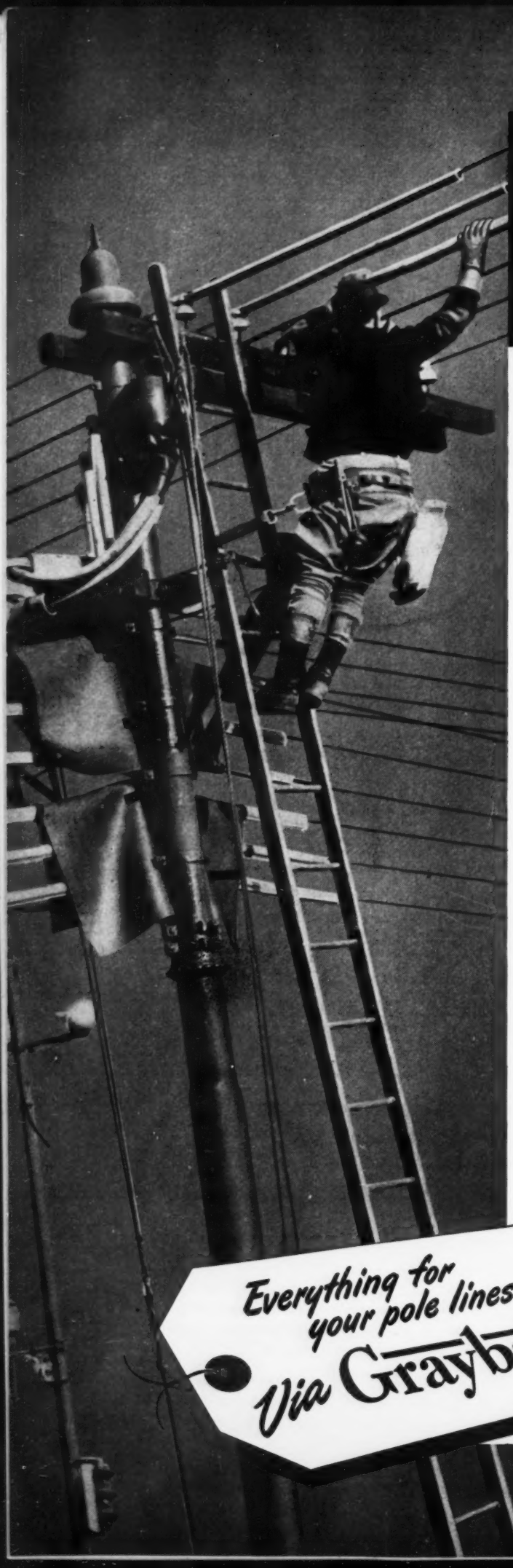

HOW SAFE

CAN YOUR LINEMEN BE?

All-over Protection

Your linemen are no safer than their equipment makes them. For surer protection, provide them with Salisbury rubber line hose, insulator hoods, protective blankets . . . rubber coats, gloves, and sleeves. Graybar has distributed these and other Salisbury safety accessories for many years. Linemen trust them.

HOT-LINE TOOLS

Graybar offers Chance hot-line maintenance tools individually or in complete sets. They incorporate the latest developments in equipment for repairing energized lines. Metal fittings are lightweight, strong, heat-treated aluminum alloy. Poles are laminated spruce. We can provide you with specialized tools of various types for performing all hot-line jobs safely and efficiently.

First for First-aid

Linemen's first-aid kits must be weatherproof, dustproof, easy to handle, and complete in the supplies they might need. That's why the M.S.A. kits available from Graybar are favorites. In addition to 10-unit and 24-unit all-weather kits, Graybar distributes pocket-size M.S.A. first-aid packets.

NEAR YOU

There are stocks of some pole-line safety equipment at a Graybar warehouse near you. You can also get prompt delivery of many other pole-line items such as safety straps, hand tools, and specialized construction tools. Let your local Graybar Representative give you specific information about them. For special help on any problem "from the bottom of the hole to the top of the pole", talk with a Graybar Outside Construction Specialist. *Graybar Electric Company, Inc.*
Executive offices: Graybar Bldg., N. Y. 17, N. Y.
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SERVING THE ELECTRICAL WEST

Announcing the New "MK-40" Air Switch

A "PREMIUM-BUILT" SWITCH — OUTSTANDING IN PERFORMANCE, RELIABILITY AND ECONOMY

Climaxing 40 years of service to the Industry, Delta-Star takes pleasure in announcing this new and truly modern development —in anticipation of requirements of the future.

Application of the knowledge gained by almost a half century of manufacturing and "living with" air-break switches, plus continuous research by our engineering staff, made possible a natural evolution in design resulting in the "MK-40". Built into it are features which make it a worthy successor to the popular "MK-39". Installation of these modern "Premium-Built" switches will result in more satisfactory operation with the heavier loads confronting all Utilities.

Available in all standard voltage and ampere ratings. For details refer to factory or our nearest district office.

SIMPLIFIED, POSITIVE MECHANICAL DESIGN—

A minimum number of moving parts.

SUPERIOR ELECTRICAL AND THERMAL CHARACTERISTICS—

A minimum of current interchange surfaces.

23 KV., 600—AMPERE "MK-40"

YOUR SYSTEM DESERVES THE BEST—INSIST ON "MK-40"

DELTA-STAR ELECTRIC COMPANY

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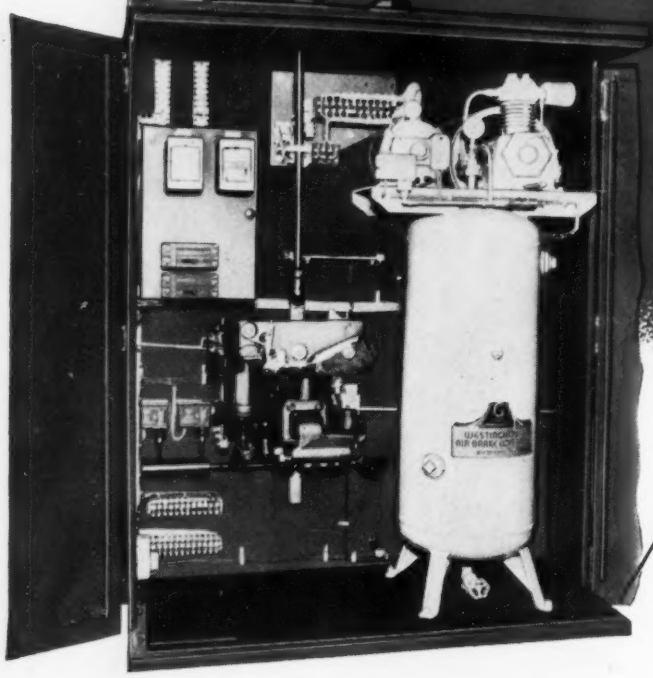
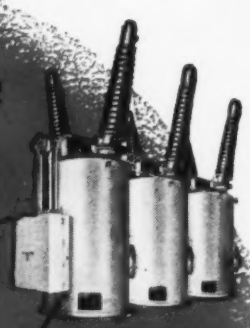
Canadian Line Materials Limited — Toronto 13, Canada

it's a quick OPEN and SHUT case





FOR BETTER SERVICE CONTINUITY ...WITH WESTINGHOUSE GM CIRCUIT BREAKERS

Pneumatic mechanism with self-contained compressor and reservoir for high-speed breaker operation. Separate AB breaker is supplied for compressor motor.

ARE YOUR BREAKERS ADEQUATE FOR TOMORROW'S SHORT CIRCUITS?

In the next three years 15,000,000 kw will be added to American generation systems. Westinghouse can help you keep pace (in some cases) by boosting the interrupting rating of your present breakers... or in developing a planned schedule of replacement to meet today's and tomorrow's peaks.

You get the highest possible degree of service continuity with Westinghouse GM Oil Circuit Breakers. This is because their operation is fast—opening in 5 cycles, reclosing in 20 cycles—with almost instantaneous extinction of the arc. The result: better service continuity . . . improved system stability.

A pneumatic mechanism, pneumatically trip-free in any position and electrically trip-free in the closed position, provides fast, 5-cycle opening. And this same mechanism permits fast reclosing.

Ratings range from 69 to 230 kv, with interrupting capacity up to 5,000,000 kva. For more detailed information, write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-60677

Westinghouse
PLANTS IN 25 CITIES... OFFICES EVERYWHERE

GM CIRCUIT BREAKERS

Use These Varnishes

IRVINGTON #100
CLEAR INTERNAL DRYING INSULATING VARNISH

IRVINGTON #500
BLACK INTERNAL DRYING INSULATING VARNISH

when you need
FREEDOM FROM ATTACK ON MAGNET WIRE . . . GOOD STORAGE STABILITY . . .
GOOD METAL ADHESION . . . FLEXIBILITY . . . OIL RESISTANCE

When No. 100 Clear Internal Drying Baking Varnish is used workmen can easily identify coded wires. Leads also remain flexible.

Treated with Irvington No. 500 Black Internal Drying Varnish, this cut coil shows how thoroughly the varnish penetrates the interstices and converts the individual windings into a solid, unit-acting mass.

These varnishes are formulated using Varnish Makers' and Painters' Naphtha – a low solvency thinner. Therefore, they are less likely to attack enamelled coating on magnet wire than insulating varnish made with higher solvency thinner.

Nos. 100 and 500 Internal Drying Varnishes have sufficient bonding strength to prevent movement and shifting of wires often occurring in rotating pieces. Yet they provide a flexible structure in the cured state. Both varnishes adhere well to metal and are unusually resistant to the action of lubricating and transformer oil.

OTHER ADVANTAGES OF NO. 100

Easy identification of coded leads.

Resistance to heat is proved by a test which indicates its life to be well over 1000 hours at 105° C.

Unusual moisture resistance. Tests show that when No. 100 is coated on bond paper, cured, and immersed in water for 24 hours, there is little loss of dielectric strength.

Dielectric strength is 2250 V.P.M.

Baking time at 275° F. ranges from 4 to 6 hours.

TWO JOBS IN ONE BAKING WITH NO. 500

Because of its excellent insulating qualities, metal adhesion and blackness, No. 500 not only insulates the windings of a motor stator but also serves as a finish coat for the metal frame or casting.

Dielectric strength is 2100 V.P.M.

Baking time at 275° F. ranges from 4 to 6 hours.

Jet black and internal curing, No. 500 is ideal for infra red baking.

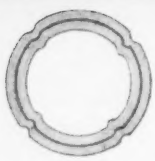
Write for samples and further information on these internal curing varnishes.

IRVINGTON
Varnish & Insulator Co., Irvington 11, New Jersey
"Look To Irvington For Continued Leadership In Insulation"

APPROVED • NEATER • FASTER • STRONGER •

use BRIEGEL ALL-STEEL INDENTER-TYPE fittings

Select the best, insist on Briegel All Steel Fittings, the only approved Indenter type connectors and couplings for thin wall conduit tubing. You will not only find that Briegel Indenter Fittings are easier and faster to use, but also make neater, stronger connections. Two Easy Squeezes and they're set. Start using Briegel Fittings today. Have more satisfied customers—more profits from each job!



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All B-M Fittings Carry the Underwriters' Seal of Approval

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GALVA, ILLINOIS

ELECTRICAL BOOKS

ELECTRICITY — PRINCIPLES AND PRACTICE, by C. S. Siskind, assistant professor of electrical engineering Purdue University; 448 pages, 5x8, McGraw-Hill Book Co., $2.60.

This book is intended for use in short courses for university students not majoring in electrical engineering, or junior colleges and vocational schools. Presentation of the general elementary principles of direct and alternating currents with their application to common electrical devices is supplemented by detailed instructions for construction and operation of simple but effective classroom demonstrations.

Each chapter is followed by a detailed outline-summary, a group of questions covering the important points, and from ten to twenty practical problems. Mathematics has been limited to simple arithmetic and first-year algebra, with only here and there rigorous derivation of equations where helpful to better understanding.

One feature which will be appreciated by instructors or groups of students using this book is an appendix listing visual aids—movies and slidefilms—available and pertinent to the material presented in each chapter.

THERMODYNAMICS, by Lester C. Lichty, professor of mechanical engineering, Yale University; 341 pages, 6x9, 12 tables and charts, McGraw-Hill Book Co., $4.50.

That recent developments in the field of science have warranted an extension of standard texts in thermodynamics is well illustrated by this second revision of Lichty. In addition to streamlining the classical approach to energy, mediums, and thermodynamic cycles, the author has treated gas turbines, supersonic flow, Mach number, shock, jet and rocket propulsion, ram-chamber and diffuser processes. Liberal use of diagrammatic sketches of apparatus, illustrative examples, and numerous exercises should be of considerable help in understanding a subject which, in the author's words, "... has so baffled the average student that it has acquired the reputation of being a most formidable subject..." This volume should be of material assistance in dispelling that reputation.

VACUUM TUBES, by Karl R. Spangenberg, professor of electrical engineering, Stanford University; 860 pages, 6x9, McGraw-Hill Book Co., $7.50.

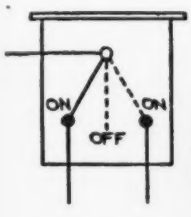
"... Although engineers and physicists... are primarily concerned with the utilization of already developed vacuum tubes, successful application of these tubes is greatly enhanced by a knowledge of their limitations and an understanding of the origin of their characteristics." To bridge the gap between physical laws of electron behavior and external characteristics of tubes themselves to the end that these limitations and characteristics may be understood and predicted is the purpose of this comprehensive text and reference source.

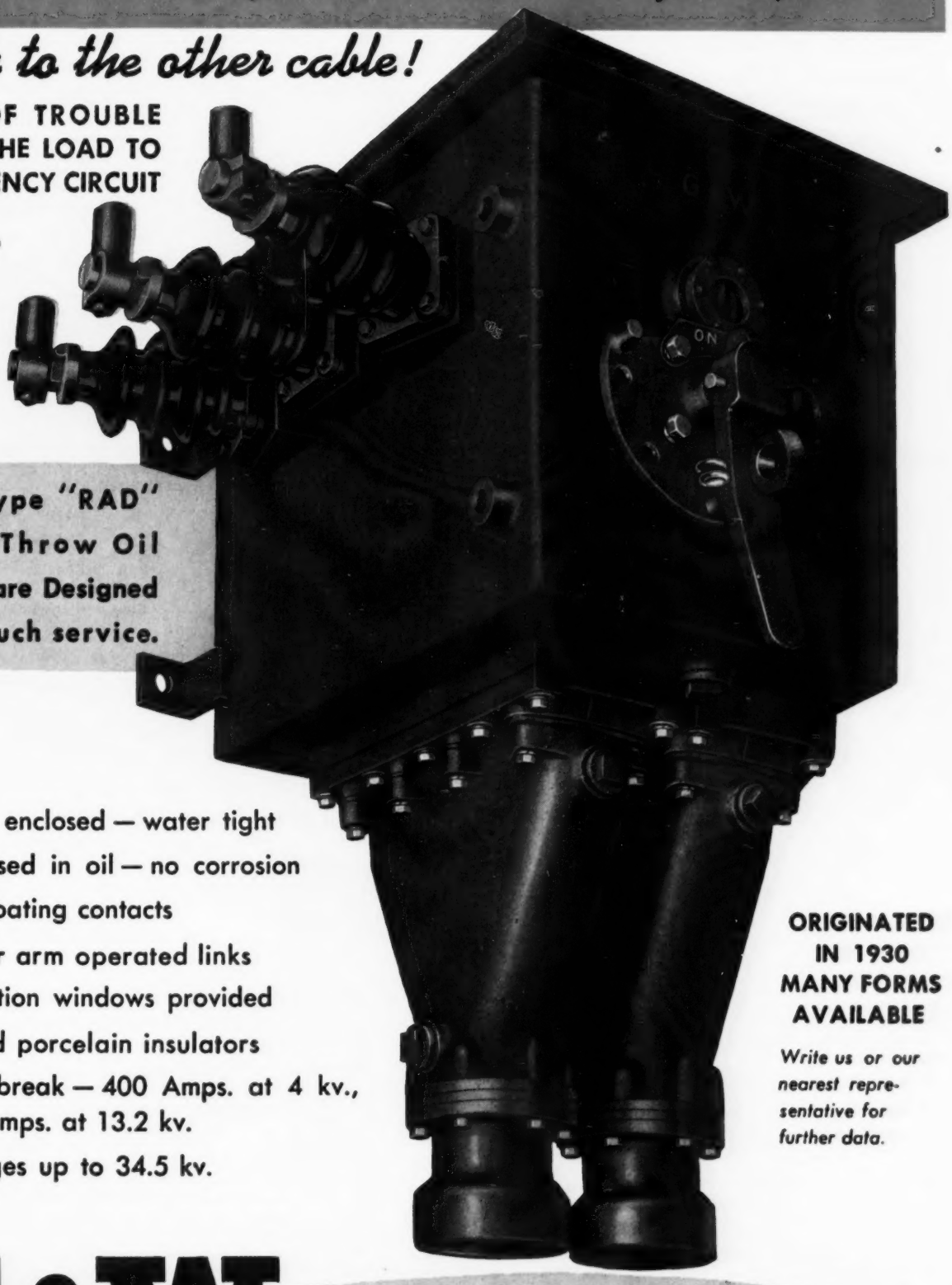
Engineers will find here a key to the multitude of types, characteristics, and functions not only of the old standbys, but such newcomers as the klystron and magnetron, and allied applications including electron optics, magnetic lenses, cathode ray tubes and a host of others. A thorough-going complete addition to the literature bridging pure physics and practical engineering.

Be Ready for that Emergency!

Switch to the other cable!

IN CASE OF TROUBLE TRANSFER THE LOAD TO THE EMERGENCY CIRCUIT





G&W Type "RAD" Double Throw Oil Switches are Designed for just such service.

- Metal enclosed — water tight
- Immersed in oil — no corrosion
- Full floating contacts
- Rocker arm operated links
- Inspection windows provided
- Sealed porcelain insulators
- Load break — 400 Amps. at 4 kv., 100 Amps. at 13.2 kv.
- Voltages up to 34.5 kv.

ORIGINATED IN 1930 MANY FORMS AVAILABLE

Write us or our nearest representative for further data.

G&W ELECTRIC SPECIALTY CO.

7780 DANTE AVENUE CHICAGO 19, ILLINOIS

Potheads • Boxes • Oil Fuse Cutouts • Oil Switches • Multitaps • Splicing Kits

G&W ELECTRIC SPECIALTIES

What's your score?

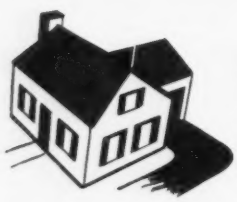
(A three-minute test on the effective use of wiring materials)

1 Existing service entrance consists of ¾-inch conduit containing two No. 8 Type R wires. How can this installation be made suitable for an electric range without tearing out the conduit?

A — *Install a second service entrance.*
B — *Run two No. 6 Type T wires and one bare No. 8 conductor in existing conduit.*
C — *Tap into the next door neighbor's circuits.*

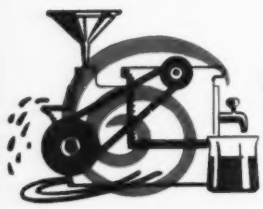
2 Why are fuse contacts sometimes silver-plated?

A — *Silver provides unusually fine conductivity.*
B — *Silver contacts cannot arc.*
C — *They look better with silver.*



3 Many electricians are saving time in box installations on residential wiring jobs. How are they doing this?

A — *By using precut wooden spacers.*
B — *Through the use of S-type bar hangers.*
C — *By nailing boxes directly to the plaster.*



4 A million feet of what famous wire was used in what fabulous machine and by what university?

A — *Deltabeston**
B — *The Navy's Mark II calculator*
C — *Harvard University*

Answers

1 Okay, if you chose *B*. And you'll be wise to make it General Electric thermoplastic every time you choose a building wire, because General Electric has always been a leader in the production and sale of thermoplastic-insulated wire.

2 Make it *A*, because silver oxide has the unusual property of reverting to pure silver when it gets hot. Silver-plated contacts eliminate premature blows from heating due to oxidation. That's one reason why G-E Silvend fuses are so efficient, regardless of how long they remain in service.

3 Pick *B* for this one. G-E S-type bar hangers are made to fit framing spaced from 6 to 24 inches. A new, heavy-duty stud affords ample support for any modern fixture.

With a G-E S-type hanger, a box can be located on the bar at any point between studs simply by tightening a single screw.

4 It takes *A*, *B*, and *C* to run up a score on this one, because they're all correct. We put them all in, because it is a pretty good testimonial to the reputation of heat-resistant General Electric Deltabeston. Users everywhere will agree.

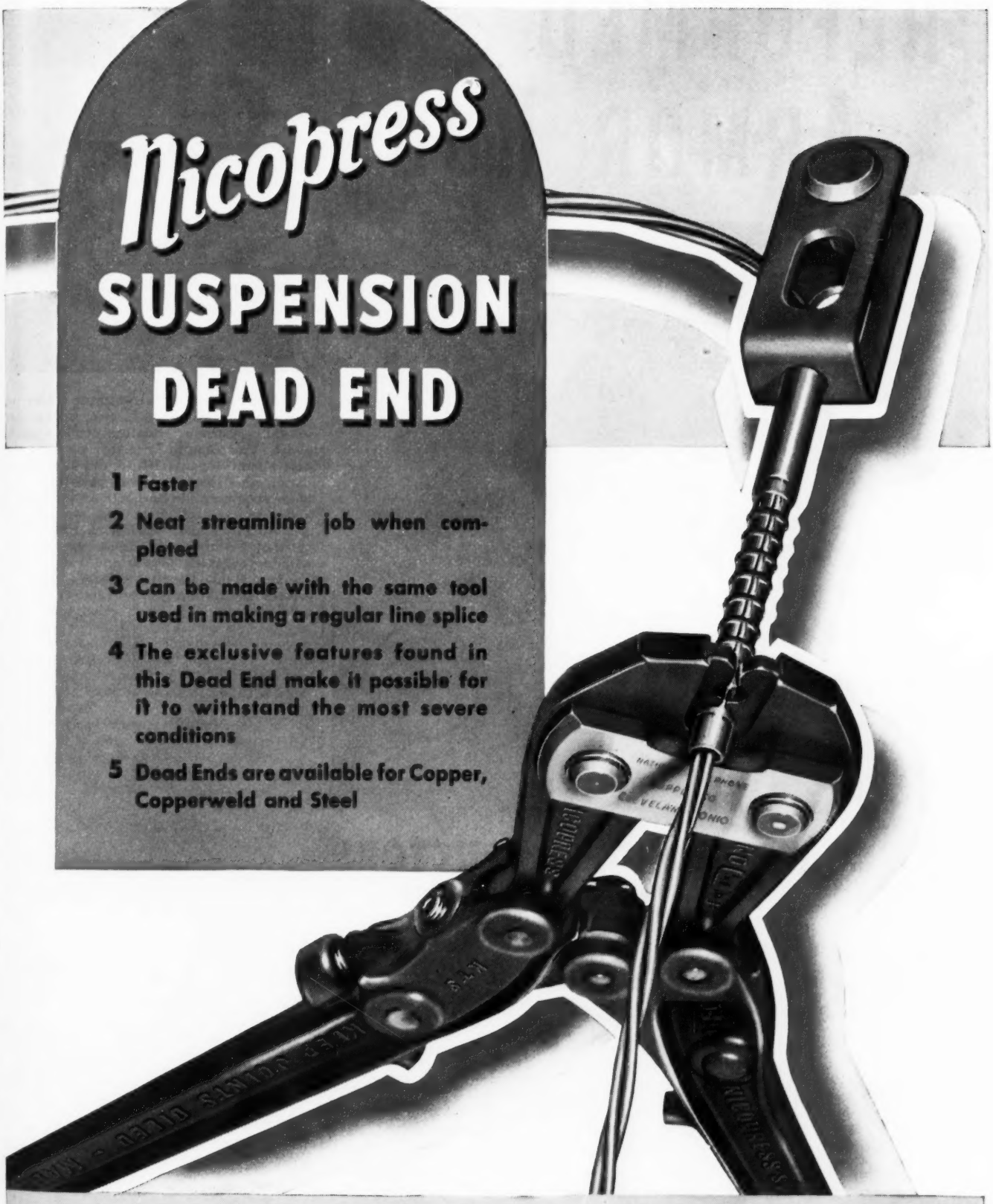
We hope this little quiz was fun. And maybe it will help to give you a better picture of G-E Construction Materials—the full line for all wiring needs. Each part of the line is made for ready use with other G-E wiring materials. It's a line that has been designed for your convenience—in ordering—in installation—and in maintenance. And it is backed up by experienced men who are always ready to help you with engineering and application counsel on your every job. It's the kind of *one source, one complete line* service that makes it easy for you and your customers to do a top-notch wiring job. If you want information on any of our products, please write to Section K7-625, General Electric Company, Bridgeport 2, Connecticut.

*Trade-mark Reg. U. S. Pat. Off.

Construction Materials

GENERAL ELECTRIC

Nicopress SUSPENSION DEAD END



1 Faster

2 Neat streamline job when completed

3 Can be made with the same tool used in making a regular line splice

4 The exclusive features found in this Dead End make it possible for it to withstand the most severe conditions

5 Dead Ends are available for Copper, Copperweld and Steel

The National Telephone Supply Company

5100 SUPERIOR AVENUE • CLEVELAND 3, OHIO

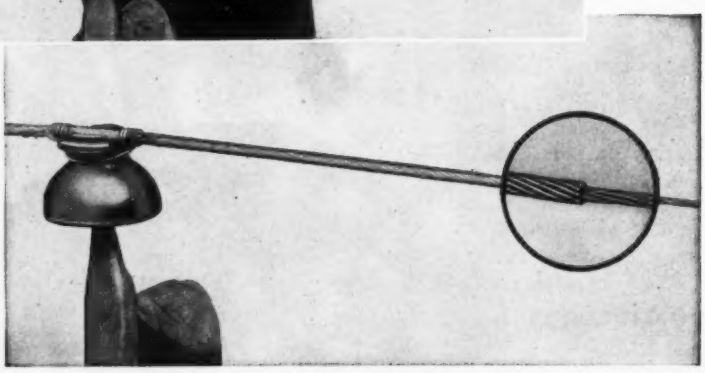
Canadian Mfr.: N. SLATER CO., LTD., HAMILTON, ONTARIO, CANADA

Export Distributor: INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

THE NATIONAL TELEPHONE SUPPLY COMPANY

PREFORMED ARMOR RODS

Quickly, easily applied



SAFE-GUARD CONDUCTORS AT LOW COST

1. Reinforce conductors at supports
2. Dampen vibration
3. Minimize wear
4. Protect against arcing
5. Increase holding power
6. Reduce corrosion

Preformed Armor Rods provide a dependable, economical way to reinforce and protect overhead conductors and static wire at the point of and in the region of the support. They minimize wear and chafing, tend to absorb and dissipate vibration, protect the conductor against arcing and flashovers, reduce the possibility of corrosion, provide excellent holding power against slippage.

Easily and quickly applied by hand or with "hot-line" tools. Available in galvanized steel, aluminum, copper or bronze.

Write for Descriptive Bulletin, No. PR-100.

INDIANA STEEL & WIRE COMPANY · MUNCIE, INDIANA

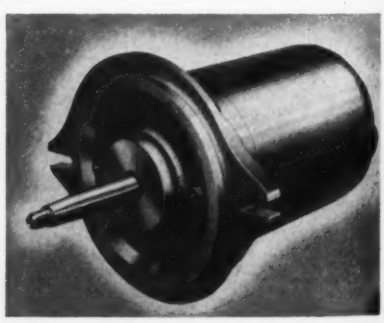
PRODUCT NEWS

Watthour Meter (600)

Heart of the new I-50 watthour meter just announced by General Electric is the magnetically suspended rotating element shown above. Two concentric cunico magnets support all the weight of disc and shaft, eliminating jewel bearings. Only physical contact is between graphite bushings on the element and stainless-steel guide pins top and bottom which maintain vertical alignment.

Other features are a new electromagnet with polyethylene plastic and butyl rubber insulations, a damping system which decreases side thrust, pointer- and cyclometer-type registers, unit construction with damping magnets cast into the frame, current and potential coils molded to laminations, and a one-piece molded base. Corrosion resistance is provided in the socket-connected type by molded base and stainless steel covering; in the front-connected type all exposed parts are of aluminum. Physically the I-50, which has been designed in an attempt to give almost a lifetime of trouble-free operation at minimum maintenance costs, is 18% smaller, 30% lighter than present types.

Motor (601)

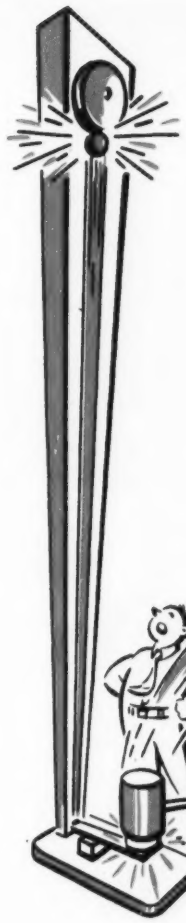


Logan Electric Co. is offering a fractional horsepower series wound motor, a-c or d-c, 115-230 volts up to 3/4 hp., 3,000 to 16,000 r.p.m. under load; field diameter of 3 3/16 in.

Wire Joint (602)

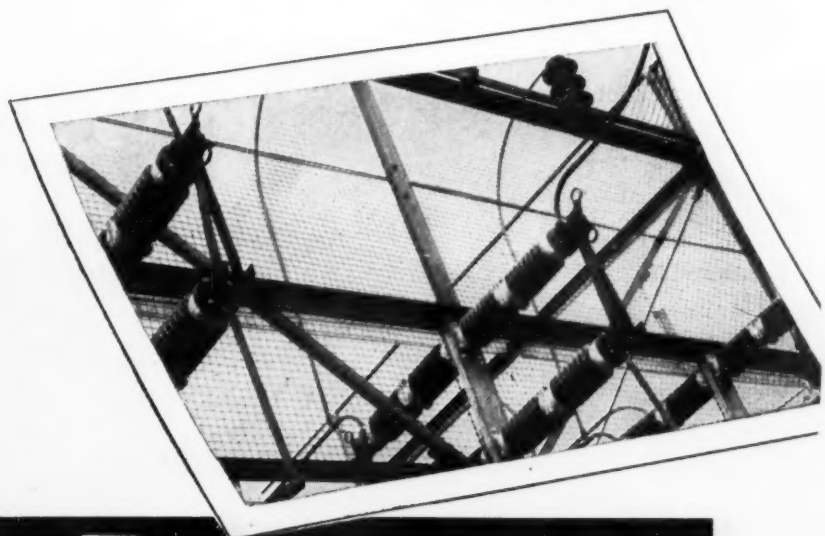
Thomas & Betts has announced a specialized solderless wire joint for fixture and appliance manufacturers. Construction consists of high-strength, high dielectric insulation permanently molded around a seamless bronze barrel which becomes an integral part of the connector. Design permits connection and insulation of wiring in one operation. Available in any standard color for wire.

50,000 LBS. PER SQ. IN.*



That's the compression strength of Lapp electrical porcelain—about ten times greater than its tension strength. It's a figure we thought we could take advantage of in designing a crack-proof and a high-impact strength insulator. That's why we designed the Station Post so that thermal and other uncertain loadings on the porcelain could be only in compression; why we attached all hardware externally, why we eliminated nested porcelain parts, and gave each of its two cemented joints a large area of attachment. The results? They're measurable in laboratory figures, but they're most significant to you and to us in the magnificent operating record, in the *extra* margin of operating security of switching and station equipment insulated on Lapp Station Posts.

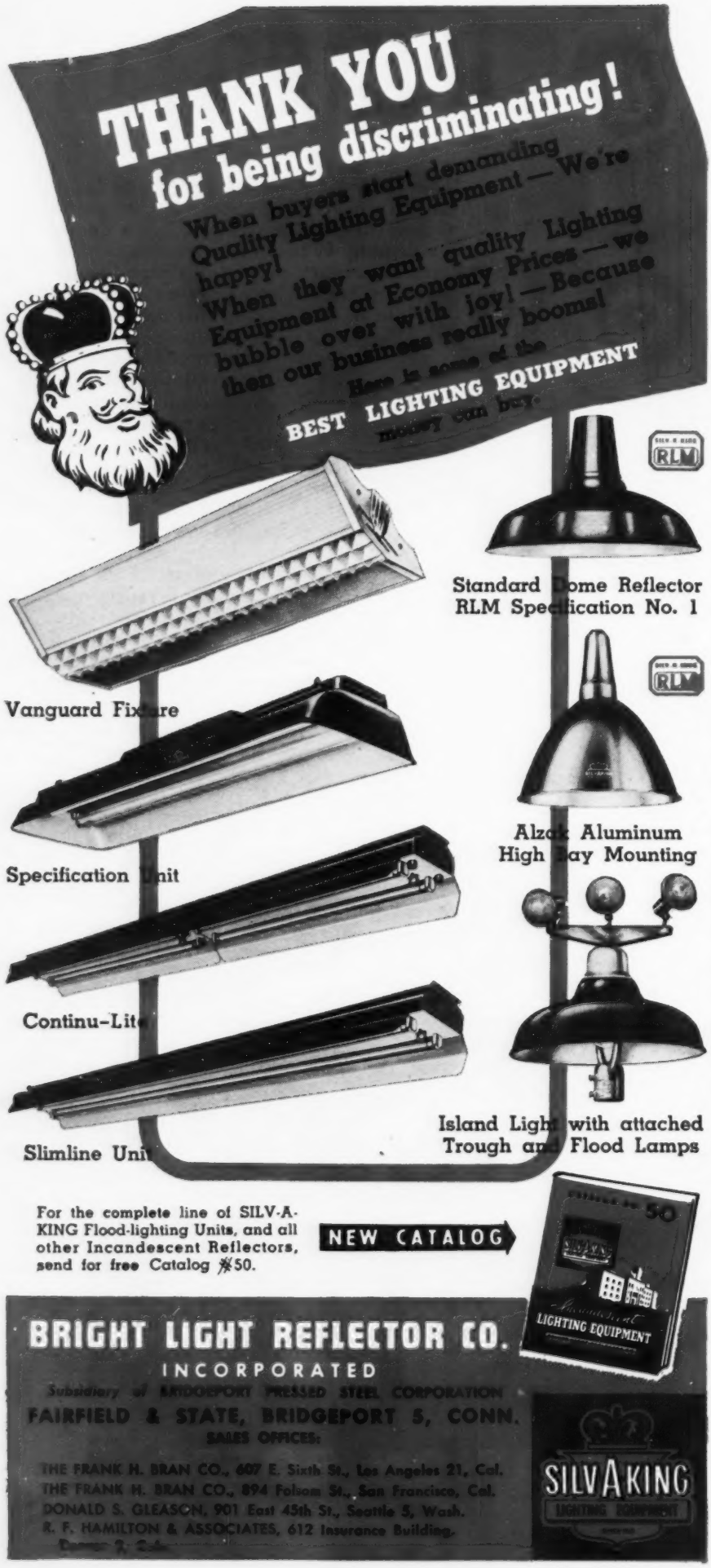
**A conservative figure. With favorable loading, laboratory measurements of compression have often exceeded 100,000 lbs. per sq. in.*



Lapp

STATION POSTS

LAPP INSUL'ATOR CO., INC. • LE ROY, N.Y., U.S.A.


THANK YOU
for being discriminating!
When buyers start demanding Quality Lighting Equipment — We're happy!
When they want quality Lighting Equipment at Economy Prices — we bubble over with joy! — Because then our business really booms!
Here is some of the
BEST LIGHTING EQUIPMENT
money can buy.
RLM
Standard Dome Reflector
RLM Specification No. 1
Vanguard Fixture
Alzak Aluminum
High Bay Mounting
Specification Unit
Continu-Lite
Island Light with attached
Trough and Flood Lamps
Slimline Unit
For the complete line of SILV-A-KING Flood-lighting Units, and all other Incandescent Reflectors, send for free Catalog #50.
NEW CATALOG
LIGHTING EQUIPMENT
BRIGHT LIGHT REFLECTOR CO.
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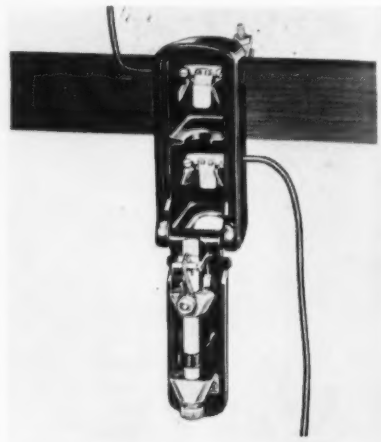
THE FRANK H. BRAN CO., 894 Folsom St., San Francisco, Cal.
DONALD S. GLEASON, 901 East 45th St., Seattle 5, Wash.
R. F. HAMILTON & ASSOCIATES, 612 Insurance Building,
SILV A KING
LIGHTING EQUIPMENT

Cutout (603)

W. N. Matthews Corp. has announced a new indicating dropout porcelain-housed cutout in 50-amp. 5- and 7.5-kv. ratings with 1,200-amp. interrupting capacity. The fuseholder-door assembly swings open and down when fuse link melts and separates, providing highly visible indication of fuse outage.



The fuseholder is then entirely out of the circuit and dead hinge insures against any danger of feed-back, the announcement states. When fuse link melts or blows, resulting arc is completely extinguished and confined inside of fiber-bakelite fuseholder tube before main contacts are disconnected, preventing burning of these parts.

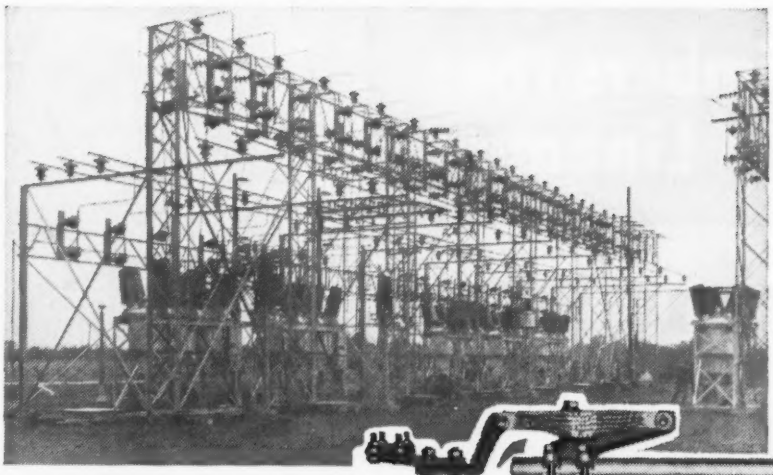
Fuseholder-door assembly is easily removed for installation of fuse link and swivel-type hanger permits positioning of cutout for lineman's convenience. Cutouts may be converted to disconnecting switches by replacing fuseholder-door assemblies with solid disconnect blade-door assemblies, manufacturer reports.

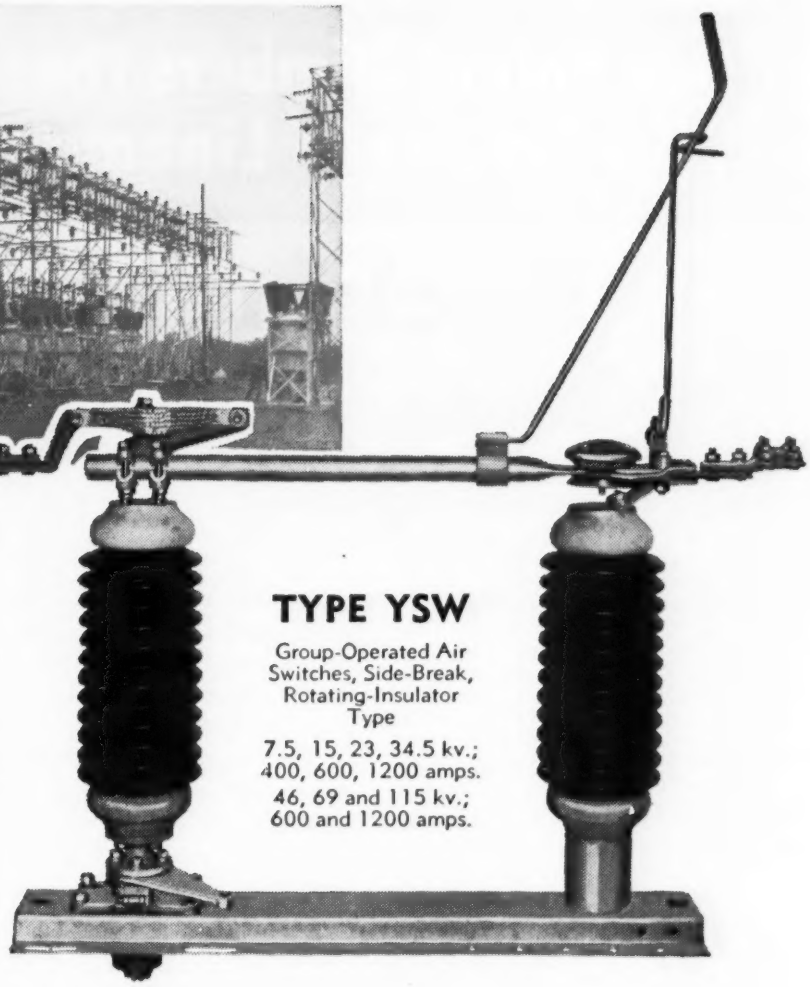
Midget Breaker (604)

A midget circuit breaker which will interrupt 5,000 amp. at 125 volts a-c and withstand a mechanical impact up to approximately 150 ft. lb. is available from Westinghouse. Damping by a specially shaped bimetal overload element accounts for its ability to withstand high mechanical impacts. A fast-acting breaker with small contact separation is made possible by use of the over center principle in the circuit breaker mechanism; contacts of special alloy and a De-ion arc extinguisher. The breaker is arranged for front-of-panel or rear-of-panel mounting. Mounting dimensions, exclusive of terminals and operating handle: 3 in. long, 2⅛ in. deep, 1 in. wide.

Time Switch (605)

G-E is making a time switch, Type T-47, rated 35 amp. at 115 and 230 volts and timed and operated by synchronous, self-starting, permanently lubricated Telechron motor. It is designed for on and off timing of a single circuit and will perform one on and off operation during any 24-hour period, continuing daily without adjustment. Operation may be manual or automatic. In automatic operation, a minimum setting of five minutes and a maximum of 22 hours between on and off is possible. Manual operation may be independent of automatic settings already on the dial. The switching cycle is resumed automatically after the hand operation is completed.





PACIFIC ELECTRIC

Solid Silver ROLLING CONTACTS

assure

TYPE YSW

Group-Operated Air Switches, Side-Break, Rotating-Insulator Type

7.5, 15, 23, 34.5 kv.; 400, 600, 1200 amps.

46, 69 and 115 kv.; 600 and 1200 amps.

Easy Switch Operation all year 'round

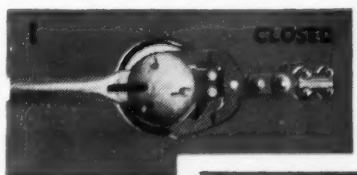
Rolling-Disc Contacts using high unit pressures assure good contact and easy operation. No flexible jumpers are used on these contacts. No current carried by pins or bolts. Solid Silver Inserts maintain current-carrying ability.

Above insulator caps, the parts are nonferrous. The ferrous parts below are double hot-dipped galvanized.

Rotating Insulators have anti-friction, widely-spaced ball bearings with weather shields.

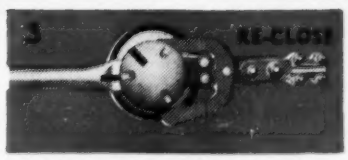
The switch is light in weight, of simple design and well known for its low maintenance. Insulators of N.E.M.A. Standard. It is easily installed, no further adjustments necessary. Get all facts on the YSW Switch, its reliability and its easy operation the year 'round.

How the Exclusive Rolling Contacts Reduce Friction, "Run" Cooler, and Assure Easier Operation



1 This view, as well as those following, looks down on the contact. Notice the line marked on the axis of the disc and blade.

2. As the blade leaves the contact, the disc rotates like a wheel.



3 The next time the blade enters contact, an entirely new contact position is presented to the blade.

PACIFIC ELECTRIC MFG. CORPORATION

5815 THIRD STREET, SAN FRANCISCO 24, CALIFORNIA • P. O. BOX 419, GARY, INDIANA

C. H. CUTTER, 814 Securities Bldg., Seattle 1, Wash.
G. B. KIRKWOOD, 437 S. Hill St., Los Angeles 13, Calif.
J. E. REDMOND CO., 400 W. Madison St., Phoenix, Ariz.
KIPPNER AND POLLEY, 1 Downing St., Denver 9, Colo.
MYRON SWENDSEN, P. O. Box 156, Boise, Idaho
A. A. MARRS, 526 Dwight Bldg., Kansas City 6, Mo.
C. C. MUSGROVE, 508 Southland Life Annex, Dallas 1, Texas
ARKANSAS ELECTRIC CO., 316 Louisiana St., Little Rock, Ark.
EDGAR F. HUBERT CO., 936 Statler Bldg., Boston, Mass.
H. R. SLOCUM CO., 304 Damon Bldg., Honolulu, T.H.

Other Representatives in Principal Cities

One Pair of Climbers That Will Fit Every Lineman

Buckingham

ADJUSTABLE Climbers

Entire upper assembly is raised or lowered by sliding the two supporting rods in their tubular sockets. The two set screws securely clamp the adjustable part in desired position.

Gaff is replaceable by driving out the "Driv-Lok", then forcing the gaff down and out.

Correct size in climbers — to fit the biggest or the shortest man on the crew — is on hand with every pair of BUCKINGHAM *Adjustable* Climbers. Each adjustable climber can be lengthened or shortened over the full range from sizes 15 to 18½. Linemen get a better fit with adjustable climbers . . . the exact length that fits best, instead of to the nearest half-inch. All the safety and comfort that has made Buckingham climbers famous among men who use climbers, will be found in them.

The feature of replaceable gaffs eliminates discards because of blunted or broken gaffs. The gaff is locked to the body of the climber at an angle which will not permit it to become disengaged in normal use. The angle of the gaff permits the lineman to stand closer to his work with less possibility of cutout, and also makes climbing easier.

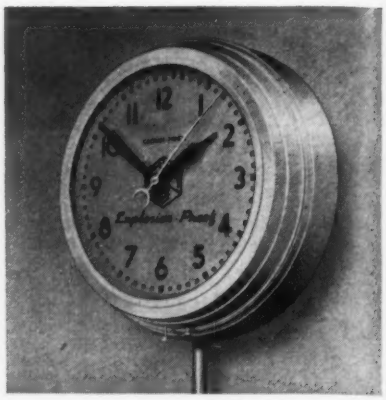
BUCKINGHAM Adjustable Climbers are fitted with leg and foot straps, and BUCKINGHAM de Luxe leather pads filled with rubberized wool for greater comfort . . . they feel right the first time worn.

Linemen get *greater comfort* and *safety* from their climbers, *and* fewer pairs are required to keep every man on the job, when you standardize on BUCKINGHAM Adjustables. Ask about them at your supply house, or write directly for descriptive bulletin.

BUCKINGHAM MANUFACTURING CO., INC.

Walter E. Craw, President — 5-7 Travis Street, Binghamton, N. Y.

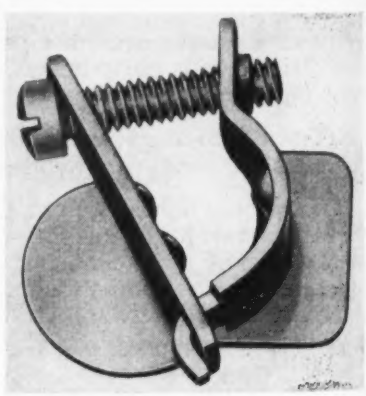
Clock (606)



An electric clock for use in hazardous locations is being made by Crouse-Hinds. In general, the appearance of this clock is similar to the usual electric wall clock. It has a 13-in. dial, 17-in. outside diameter, sweep second hand, external setting knob. It is constructed in accordance with Underwriters' requirements for devices intended for use in locations where the atmosphere is hazardous because of presence of flammable gases or vapors, or where it is laden with highly combustible dusts.

Connector (607)

National Electric Products No. 9049 EZ connector for connecting non-metallic sheathed cable to device and outlet boxes is formed of pressed steel, electro-galvanized and is of the rock-in type. A feature is the design and action of the hook which protrudes from the lower plate, up through a slot in the upper strap. When loomwire is inserted in the connector, the upper strap moves up and engages on the upper part of the hook. This movement forces the integral flange, which is rocked in through the knockout of the box, to position itself off center. According to the manufacturer, neither the top nor bottom integral flanges can be pulled through the knockout without first removing the cable from the connector. Underwriters' approved for installation with loomwire or non-metallic sheathed cable sizes No. 14/2 - 14/3 and 12/2 - 12/3.



Receptacle (608)

A one-piece white plastic outlet box pull receptacle announced by Slater Electric & Mfg. Co. was designed as a combination for use with either 3¼- or 4-in. boxes and features a short nickel chain and 4-ft. cord. Rated at 250 watts, 250 volts, the receptacle has an outside diameter of 4½ in. Specially designed knockouts allow mounting on either the 3¼- or 4-in. box. Underwriters' approved.

"OLD 94 04"
MAKES NEWS ON TWO COUNTS
Now coming into good supply, and available through local Graybar warehouse stocks, O-B 94 04 should be a volume item on your distribution lines. Check your company Purchasing Standards to be sure it appears under its proper heading. Nominal rating, 4 kv.
Spool No. 36140
Pintype No. 12848
Kingpin No. 34849
Type JB Insulator No. 31506
Suspension Insulator No. 32433
Spool No. 38911
Dead-End Thimble No. 80425
Neutral Clamp No. 81000
Universal Clamp No. 80500
Universal Clamp No. 81500
Universal Clamp No. 78500
Pintype No. 29207

O-B MAKES MORE THAN 90 ITEMS FOR RURAL AND LOW-VOLTAGE LINES

"Old 94 04" is the affectionate name thousands of power men attach to this long-established and popular O-B distribution pintype. It has done a good job, in a lot of places, and for a long time. . . Two things about it, currently, bring it into the news: first, it is coming into such good supply that orders can be filled quickly--second, this insulator is now stocked in 37 local Graybar warehouses and, by making your needs known to your Graybar representative, it can be made available in any of the 96 Graybar branches on which you now draw for many materials of this general class. . . You can get O-B Number 94 04 both quickly and easily; along with the satisfaction of knowing it is made of finest wet ware porcelain, well designed and well made, to give you sound insulation at low voltages.

Distributed by GraybaR ELECTRIC COMPANY DISTRIBUTION MATERIALS

Your local Graybar representative handles O-B low-voltage pintypes. Popular sizes are carried in nearby Graybar warehouse stocks for your convenience in ordering.

Ohio Brass

MANSFIELD, OHIO

CANADIAN OHIO BRASS CO., LTD.,
NIAGARA FALLS, ONT.

2886-H

The Simplex-ANHYDROPRENE Cable shown is made up of three elements — conductor, insulation and jacket. The stranded conductor is copper, each wire coated with tin or an alloy. The insulation is Simplex - ANHYDREX, a low water absorption, insulating compound. The jacket or outer protection is a thin layer of a tough neoprene compound.

Cables of this simple construction may have solid or stranded conductors. They have no outer braids to rot or fray. They have excellent electrical stability and good aging properties. They resist deterioration by sunlight, heat, acids, oils and they will not support a flame.

Simplex-ANHYDROPRENE Cables are suitable for use in central stations as transformer or generator leads. They may be used for control or signal service. They may be racked on walls without conduit. They may be installed overhead on messenger or pulled into underground ducts.

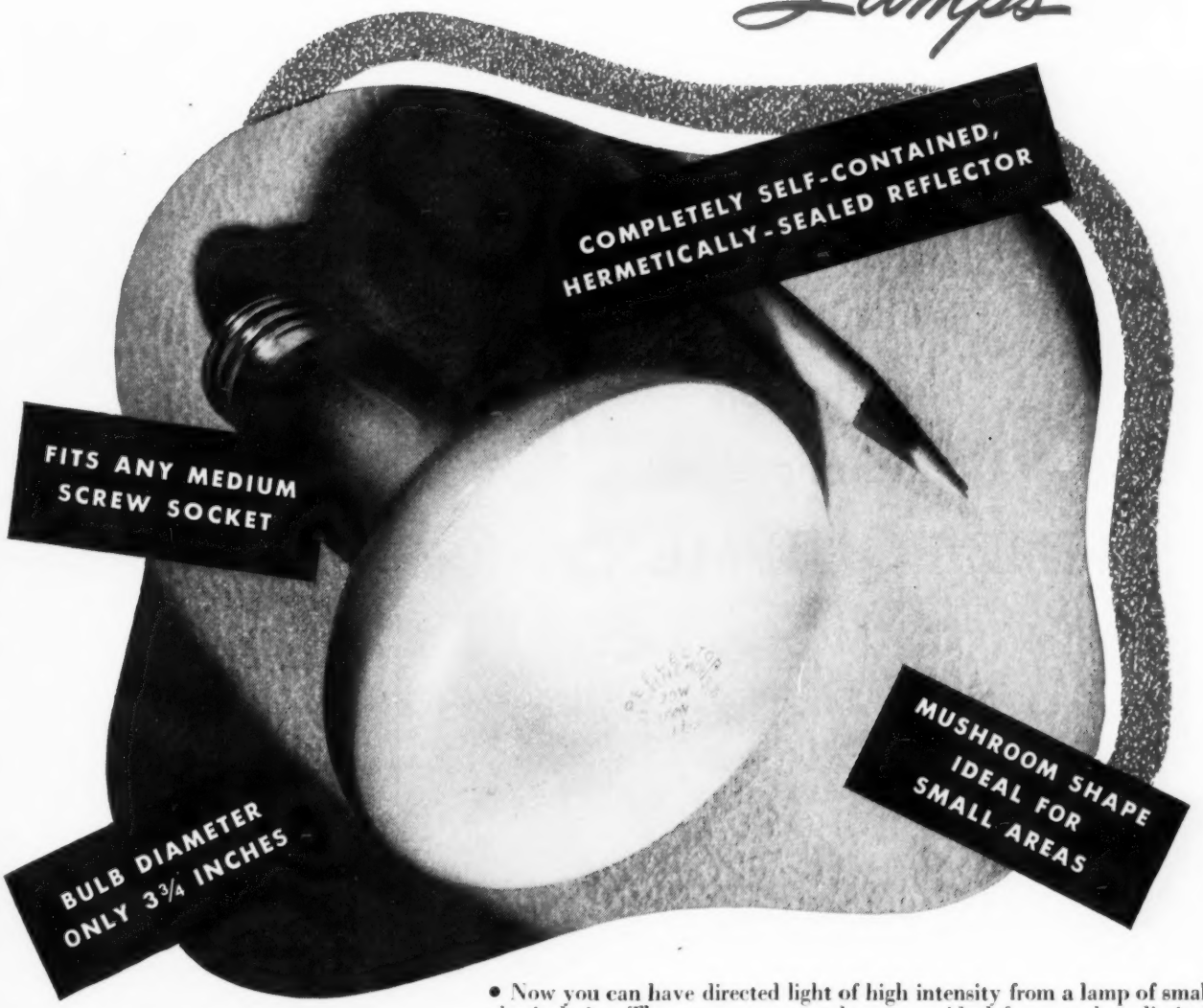
For more detailed information ask for Bulletin No. 115.

Simplex

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

NEW . . . COMPACT . . . 75 WATT Westinghouse SPOT and FLOOD Lamps


COMPLETELY SELF-CONTAINED, HERMETICALLY-SEALED REFLECTOR
FITS ANY MEDIUM SCREW SOCKET
MUSHROOM SHAPE IDEAL FOR SMALL AREAS
BULB DIAMETER ONLY 3¾ INCHES

• Now you can have directed light of high intensity from a lamp of small physical size. These new, compact lamps are ideal for use where limited space is available or where small, inconspicuous lighting units are desired. To name a few examples:

HOMES—for downlighting a table, sink, playroom, workbench; or to attain decorative effects.

STORES—for highlighting merchandise displays in store windows, counters, shadow boxes; for spot or floodlighting stairways or danger areas.

FACTORIES—for local supplemental lighting of machines and workbenches, in office and plant, or wherever exacting work requires extra illumination.

OTHER APPLICATIONS—in hotels, restaurants, theatres, night clubs and taverns, where local lighting from out-of-the-way units is preferred.

TECHNICAL DATA

- Watts 75
- Volts 115-120-125
- Bulb R-30
- Base . . . . . Medium Screw
- Service . . . . . Refl. Flood, Ref. Spot
- Filament Construction . C-11
- Max. Overall Length . . 5-3 16"
- Rated Life . . . . . 1000 Hours
- Std. Package Quantity . 60

List Price $1.25

Westinghouse Lamp District Offices:

10 High St., BOSTON; 2480 Peachtree Rd., CHAMBLEE, GA.; 20 N. Wacker Drive, CHICAGO; 40 Wall St., NEW YORK; 3001 Walnut St., PHILADELPHIA; 419 Wood St., PITTSBURGH; 410 Bush St., SAN FRANCISCO; 411 N. 7th St., ST. LOUIS

***Lamp Division,* Westinghouse Electric Corporation**
Bloomfield, New Jersey

Westinghouse Lamps

PLANTS IN 25 CITIES
OFFICES EVERYWHERE

OUR NAME MAYDWELL SPELLS QUALITY

MAYDWELL & HARTZELL
INCORPORATED
Engineers and Factory Distributors

ELECTRICAL
Transmission
Distribution
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LINE EQUIPMENT

1923 25 1948

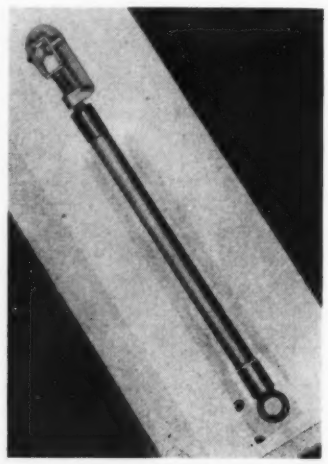
This is our 25th year of service to the utilities in the West — our organization and facilities have advanced with the needs of the electrical industry.

SALES OFFICES AND WAREHOUSES

SAN FRANCISCO LOS ANGELES
PORTLAND SEATTLE

Link Stick (609)

A roller link stick recently introduced by A. B. Chance Co. is used in conjunction with a rope to permit energized conductors to be spread at mid-span when it is necessary to install a new pole. With this tool, conductors can be pulled far enough aside to permit a new pole, complete with crossarm, to be set in place, the manufacturer claims. The device is said to measure accurately mid-span



clearance of wires above roads, rail crossings and buildings. To measure clearance, a tape or rope is attached to the butt ring of the stick. Then the tool is placed on the conductor and rolled along it by means of a rope to the point where clearance is to be determined.

Two sizes are available. One has space within the hook when gripper is closed to permit the roller to pass over a compression sleeve splice on a maximum wire size of 605,000 CM ACSR; will withstand 1,000 lb. tension. The other will pass over a compression sleeve splice size on a maximum wire size of 3/0 ACSR, when gripper is closed.

Battery Charger (610)

Industrial Electronics & Transformer Co. is offering a stabilized rectifier for unattended battery charging. This unit contains no moving parts. Voltage regulating transformers compensate for variations in a-c line voltages. Output current of 4-6-12 amp., output voltage from 3 to 60 cell ratings (booster charging feature included) with the a-c input either 110 or 220 as specified. Three models include a floor standing cabinet, wall-mounted cabinet, and wall-mounted ebony asbestos panel. Cabinet finish to customer specifications.

Plug, Wall Plate (611)

Lok-Tite Mfg. Co. has a plug and wall plate claimed to assure a tight, safe connection and prevent accidental disconnection by children or pets. The plug is attached inside a metal holder with ears so that a quarter twist of the holder will fit it snugly under specially formed receiver prongs on the wall plate. A larger industrial model has a plug of hard rubber and holder and wall plate of steel construction.

Wire Stripper (612)

Aircraft Marine Products is offering Formula 21, a liquid wire stripper which it claims is non-corrosive, non-inflammable and will not harm fabrics, wood or metal. Available in 2-oz. bottles, 1- and 5-gal. cans.

Trees climb. *too*

BRANCHES OR FOREIGN OBJECTS contacting distribution lines are liable to cause trouble . . . unless the lines are Duraline.*

For Duraline URC Weatherproof combines URC saturants and finishers with an interlocked fibrous sheath that effectively resists moisture penetration during long periods of wet weather. This means vastly improved performance during emergency periods.

For reduced maintenance costs and long, continuous service, specify Duraline URC—the weatherproof covering that is truly weather resisting. Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

*Reg. U. S. Pat. Off.

45464

ANACONDA
from mine to consumer

Duraline URC WEATHERPROOF

STAYS PUT!

STANDARD ENGINEER'S REPORT

RPM CALOL

TEST DATA

UNIT G.E. 5000 KW Steam Turbine - ~~Horiz. Steeple Compound~~ Steam - 1250 lbs. - 750° F.

LUBRICANT Calol OC Turbine Oil - 9

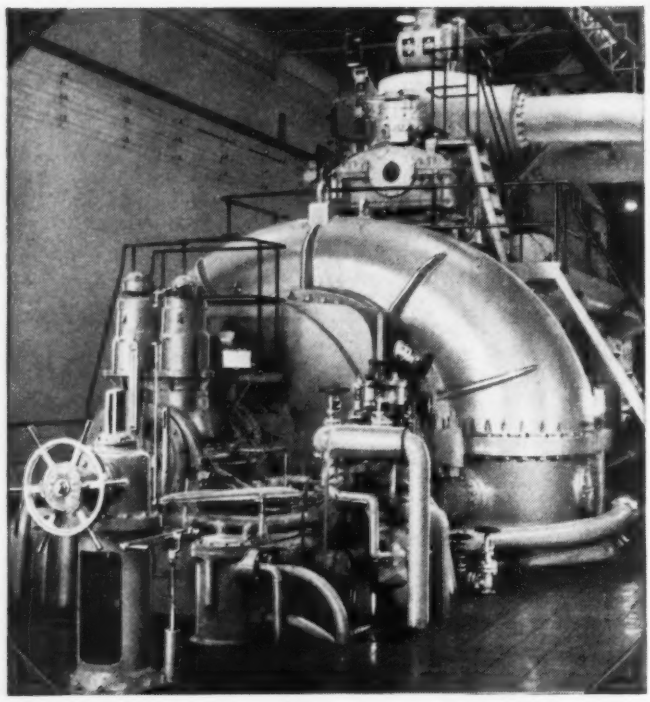
TEST PERIOD 4 Years -

CONDITIONS Operation of Generator

LOCATION San Francisco Station A

FIRM Pacific Gas & Electric Co.

SAME OIL CHARGE USED IN TURBINE FOUR YEARS SHOWS NO DETERIORATION



More than four years ago the lubrication system of this turbine-generator was charged with Calol OC Turbine Oil—9. After continuous operation on this same oil charge during all of that time, a laboratory analysis showed the oil had not increased in acidity or deteriorated. Inspection of lines, sumps, and governor control mechanism showed them to be clean and free of sludge and lacquer. Journals remained in good condition. Calol OC Turbine Oil resists both oxidation and corrosion.

FILE

STANDARD OIL ... OF CALIFORNIA

MARKET... RTMENT

SAN FRAN... FORNIA

DATE August 12, 1947

SAMPLES NO. SFO 16, 17, 18, 19

CALOL OC TURBINE OIL 9

P. G. & E. STATION A

SAN FRANCISCO, CALIFORNIA

Four samples of ... Oil 9, drawn from various equipment operated by the P... Company were received for analysis and evaluation as ...

The inspections o... samples are shown below:

Sample SFO	16	17	18	19
Viscosity at 100°F., SUS	16...	165	159	169
Viscosity at 130°F., SUS	87...	89.9	86.4	90.0
Viscosity at 210°F., SUS	44...	43.4	43.1	43.3
Sulfur, %	...	0.054	0.036	0.056
Acid No., ASTM	...	0.03	0.03	0.06
Carbon Residue, %	...	0.00	0.00	0.00
Saponification No.	...	0.0	0.0	0.0
Water, by Distillation, %	Tra...	Trace	Trace	Trace
ash, %	Tra...	0	0	0
Iron, %	...	0.001	0.001	0.001
Silica (SiO_2), %	...	0.001	0.002	0.002
Steam Emulsion Number	20...	75	132	233
Emulsion, % remaining after X minutes				
With Salt Water	...	0	0	0
With Distilled Water	33...	0	4	0
With Boiling Water	...	0	5	0

Note how clear this sample of the Calol OC Turbine Oil charge remained after 4 years of use - figures can be read through it and there is no deposit at the bottom of the bottle. The actual specifications of the used oil from the turbine-generator is one of the four sets shown here.

REMARKS: Calol OC Turbine Oil is specially compounded to provide long service and give full protection to all vital bearing surfaces. It contains a highly effective oxidation inhibitor which resists the action of air, heat and moisture, preventing sludging and lacquer formation, reducing oil maintenance costs to a minimum. Its corrosion inhibitor and excellent metal-wetting ability stop rusting, even in initial operation of turbines. Calol OC Turbine Oil is made in five grades to meet various installation conditions.

STANDARD TECHNICAL SERVICE conducted and reported this test: If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will give you expert help; or write Standard of California, 225 Bush Street, San Francisco 20.

STANDARD OF CALIFORNIA

Voltmeter (613)

A new carrier frequency voltmeter has been developed and marketed by Sierra Electronics for the special purpose of measuring carrier frequency voltages on power lines, telephone lines and cables. The instrument, which was built to specifications of a utility with a large communication network, is actually a radio receiver with a tuning range of 20 to 500 kc. Actual voltage of the desired frequency at the input terminals is indicated on a direct-reading meter, with a variable attenuator providing a range of −80 to +40 dbm.

Added features are a built-in injection oscillator for calibration, and an adjustable audio amplifier feeding a jack for headphones to listen to the incoming signal.

Power Supply (614)

Rowe Engineering Corp.'s Type 1PS10000 10-kv. iso-volt d-c power supply provides a source of continuously variable d-c voltage from 1,000 to 10,000 volts at current drains up to 5 milliamperes. According to the manufacturer, regulation of one tenth of one per cent is obtained electronically and corrects the output voltage, practically instantaneously, over full line and load variations. The device is operated on 105-130 volts, 60 cycles a-c. Power drain is approximately 350 watts at full load. Over-all dimensions: 22 in. wide; 41¾ in. high; 17½ in. deep. Weight, 225 lb.

Oscillator (615)

Frequencies from 10 cycles to 10 megacycles for measurements in the r-f, video and audio ranges are available with the new Model 650A resistance-tuned oscillator of Hewlett-Packard. Voltage range of 0.00003 to 3 volts is said to be within 1 db. of being flat for the frequency range, and virtually independent of the rated line voltage of 115 volts or changing tube characteristics. Other features are a 6 to 1 vernier tuning drive, 94-in. scale length and a complete vacuum tube voltmeter to monitor output in volts or db. Panel size is 19x10½ in., 13 in. deep, for rack or cabinet mounting.

Alternators (616)

Katolight alternators are now available in 187-kva. size 1,800 r.p.m., with direct connected exciter. A new arrangement eliminates the need of a separate switchboard, the manufacturer reports. At least 10 to 12 lead wires of size to preclude voltage drop are brought into a large steel cabinet located on the side of the generator to make the following hook-up: 10 wire—1 cir. star, 2 cir. star; 12 wire—1 cir. star, 2 cir. star, 1 cir. delta, 2 cir. delta. Voltage regulator, voltmeter and ammeter are mounted directly on top of cabinet isolated by rubber to keep vibration away from regulator and meters.

Terminal Block (617)

The Burndy Crablok terminal block assembly is furnished in several lengths and in either single- or double-tier types. The individual strips are placed end-to-end to give any required number of connections. Space saving over other types is claimed for the new design. The Crablok is normally used in 220-volt service but, according to the manufacturer, may be safely used for service up to 600 volts by insulating the contact tips with plastic sleeves.

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ON ALL
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INCORPORATED

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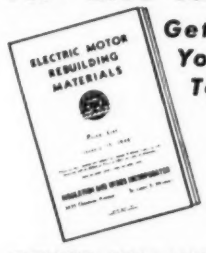

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Motor Lead Wire
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Fibre
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Wood Wedges
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Commutators
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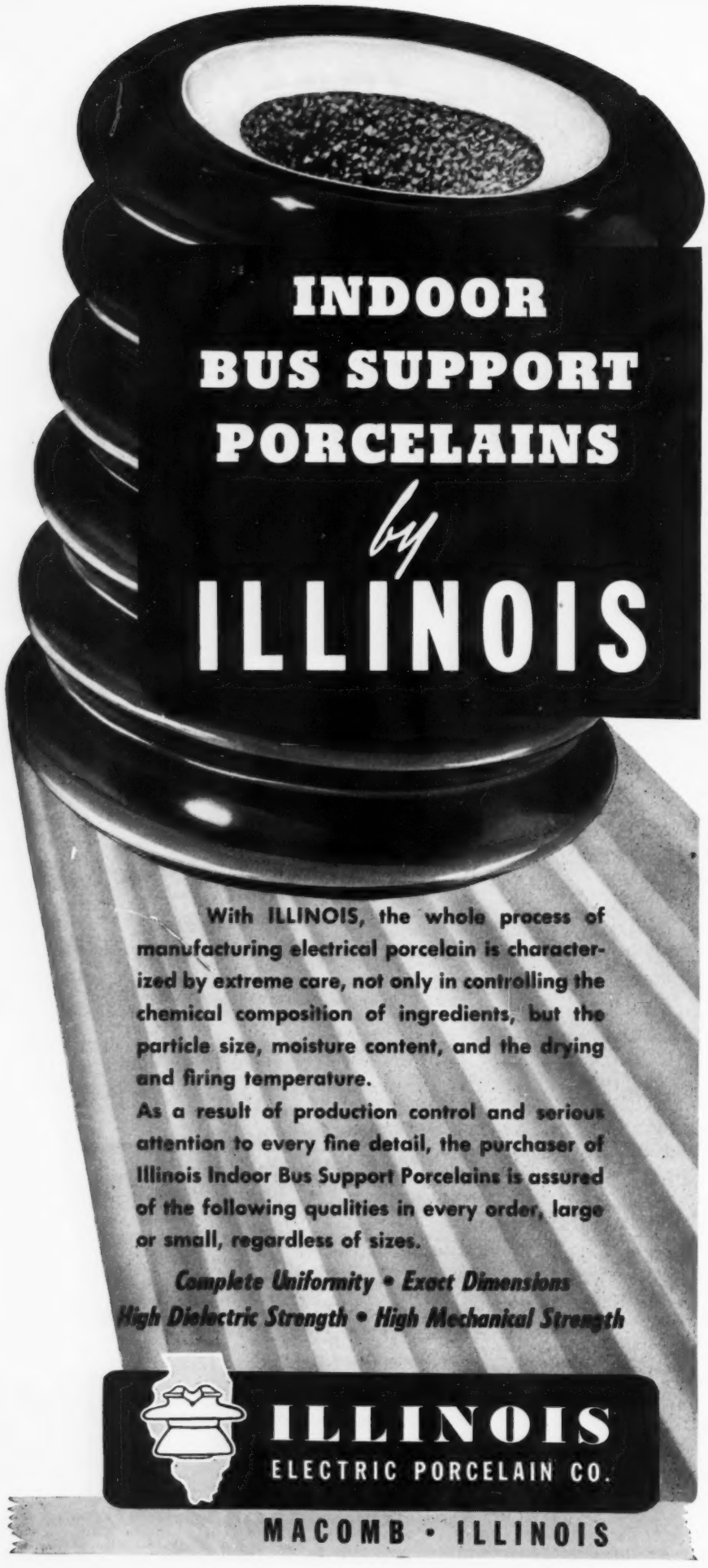
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With ILLINOIS, the whole process of manufacturing electrical porcelain is characterized by extreme care, not only in controlling the chemical composition of ingredients, but the particle size, moisture content, and the drying and firing temperature.
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Complete Uniformity • Exact Dimensions
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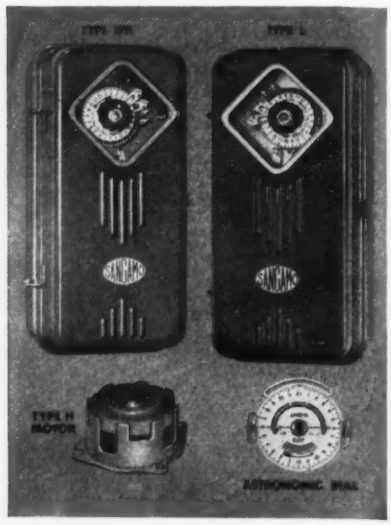
MACOMB • ILLINOIS

Time Switches (618)

Sangamo has announced major improvements in its line of heavy-duty time switches. All are now equipped with the newly developed fully enclosed hysteresis-synchronous low-speed motor, giving higher torque in starting and synchronous operation. A new



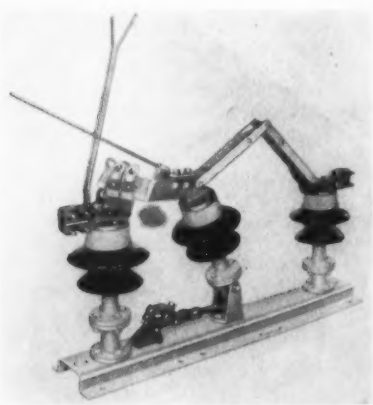
replaceable bearing system, lubricated with a special silicone product, prevents it from being affected by temperature.

The pressed-steel case has a diamond-shaped window for greater visibility; increased space inside of case for wiring and four multiple knockouts aid installation.

Closer time limits between settings permit a wider range of applications. Minimum time between settings of off and on periods is 90 minutes; time interval between on and off periods is 30 minutes. Manual tripping does not disturb automatic operation.

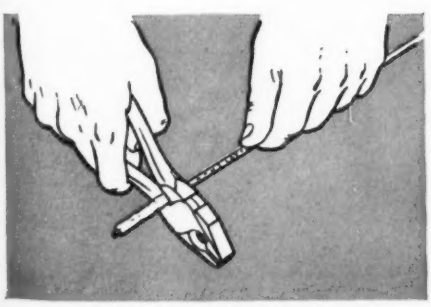
Tilting Insulator Switches (619)

A. B. Chance has redesigned its group-operated tilting insulator switches to increase ease of installation and operation. Designated Types WN and VN, the switches are made in voltages from 7.5 to 34.5 kv. and in ratings of 200 to 600 amp. Features of the new design are reversible terminal caps which



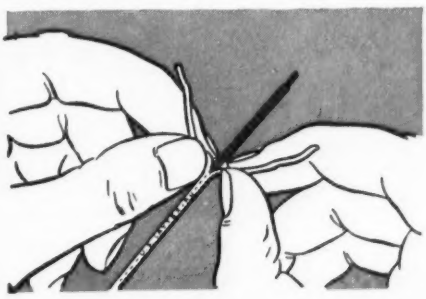
will accommodate a variety of cable and tubing sizes; flanged channel iron bases which will not cut into wood crossarms; full floating, self-aligning clips. Terminal clamps take ½- or ¾-in. IPS tubing or from No. 4 to 600,000-CM cable, according to the manufacturer's announcement.

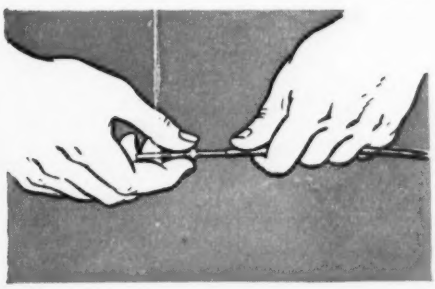
"It strips fast and easy ...It's Laytex RU"



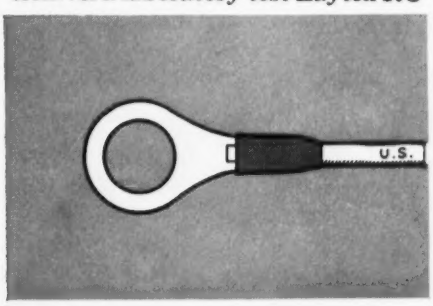
You don't need to use a knife when you strip Laytex RU. Just place the wire in the heel of side-cutter pliers—

and crush the cover for as far as you want to strip. This allows the saturated fibrous cotton cover—flame-retardant and moisture-resistant—to be quickly peeled back. The insulation is then easily rolled back . . . and you have a clean, quick strip.





There's no need to scrape with a knife—conductor is free of loose particles. Once you've made a connection, simply roll the insulation back over the barrel of the terminal and tape it up. You have a neat, streamlined job with *double* protection. In a laboratory test Laytex RU



was proved to be 33% to 300% easier to pull than 5 other leading brands. Most important of all, Laytex RU permits more wires per conduit on rewiring jobs because it is America's smallest diameter, lightest weight natural rubber insulated branch circuit wire. The dip process of applying the insulation guarantees perfect centering and no thin spots. Send today for sample plus booklet containing more details about this wire. Wire and Cable Department, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

Reg. U. S. Pat. Off.

A PRODUCT OF

U.S. RUBBER
SERVING THROUGH SCIENCE

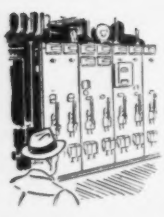
UNITED STATES RUBBER COMPANY

RU wiring with **RU?**

Allis-Chalmers Builds f

POWER

Ideal for outdoor draft fan service! Totally enclosed fan-cooled 600 hp motor with air-to-air heat exchanger



BEFORE
—an installation showing the maze of wires, dangerous open switches, and the multiplicity of parts characteristic of early switchgear installations.

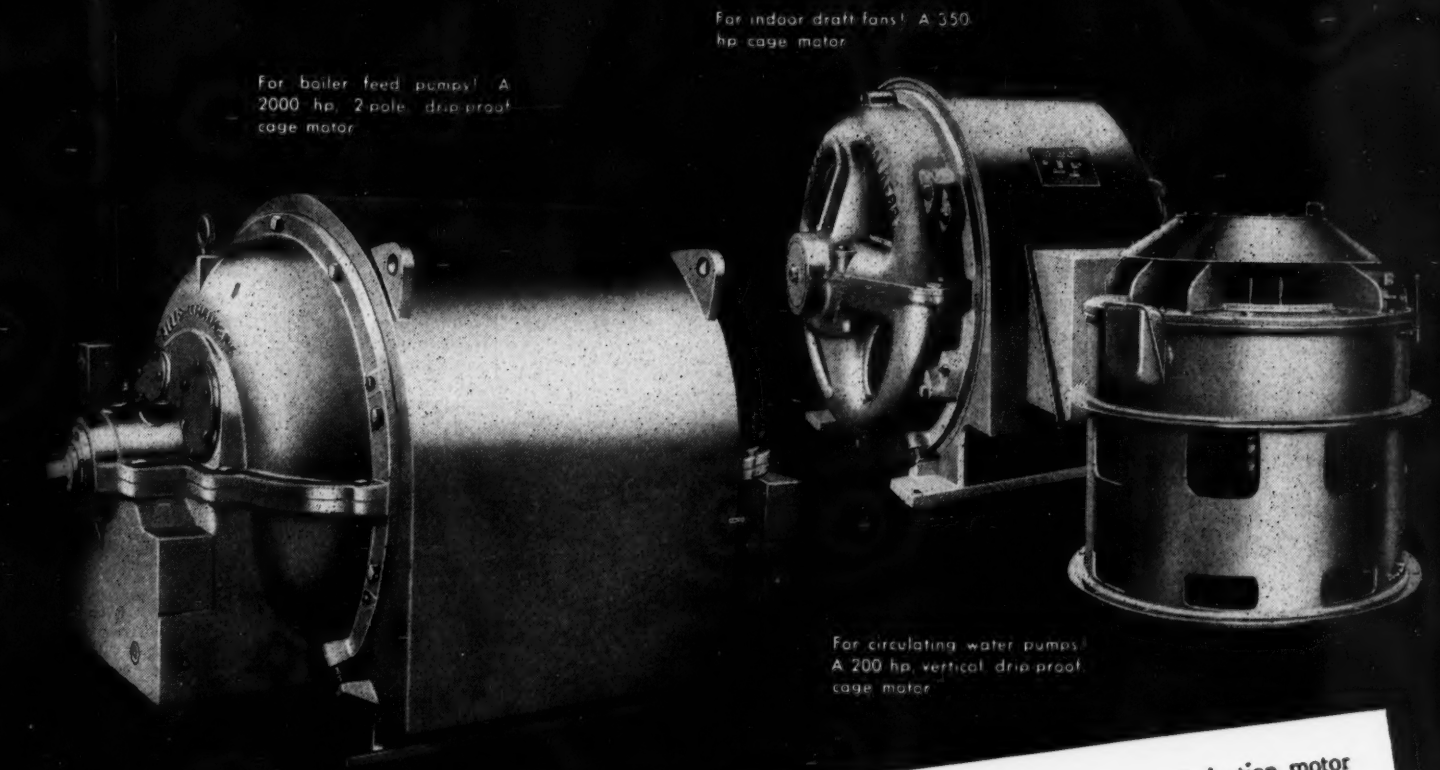
AFTER
modernization! Allis-Chalmers latest vertical lift, metal-clad switchgear demonstrates the new conception of neatness, safety, compactness.

ALLIS-

Pioneers in Power and

ls for Progress in Electric Power — Typical Example:

R HOUSE MOTORS



For indoor draft fans! A 350 hp cage motor

For boiler feed pumps! A 2000 hp, 2-pole, drip-proof cage motor

For circulating water pumps! A 200 hp, vertical drip-proof cage motor

— for conveyors, pumps, compressors, boiler fans, and coal handling — "A-C" motors 1/2 hp to largest!

SIXTY YEARS of service to the electric power industry gives Allis-Chalmers engineers an intimate knowledge of your operating problems. During these years "A-C" has developed the country's largest line of major equipment for electric power.

Included are power-house motors . . . designed with unusual care. These motors have many maintenance saving features of interest to operators.

A case in point is the totally enclosed fan-cooled motor with air-to-air heat exchanger. It's ideal for those dirty locations outdoors or indoors, driving large auxiliaries. *The only motor of its type!*

Internal air is circulated around tubes arranged about the circumference of the stator frame. Motor heat, transferred to the tubes is dissipated by cooling air blown through the straight, easy-to-clean tubes. No outside air can contact enclosed parts of the motor.

These design details of the two pole, squirrel cage induction motor illustrate another point . . . the ruggedness of A-C design. *"Tear drop" design of rotor bars* gives excellent starting characteristics — makes bars tight in the laminations and in the end rings — eliminates rotor rod and end ring failure. *End rings* — forged from copper alloy castings. Bearings — liberal in design and easy to dismantle for inspection.

These are typical examples of the advanced design thinking that makes Allis-Chalmers a good name to know in electric power. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

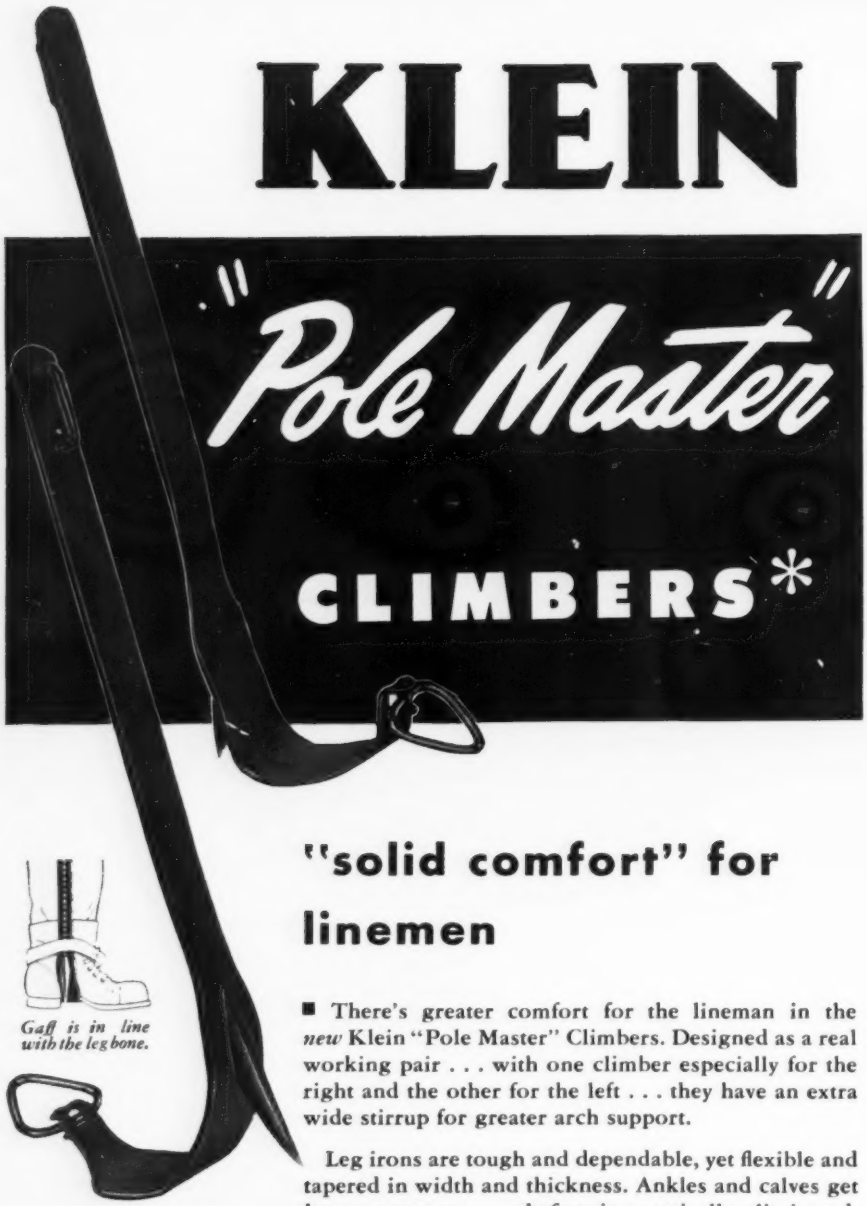
A 2441

CHALMERS

Electrical Equipment From Generation Through Utilization

KLEIN

"Pole Master" CLIMBERS*



Gaff is in line with the leg bone.

"solid comfort" for linemen

■ There's greater comfort for the lineman in the *new* Klein "Pole Master" Climbers. Designed as a real working pair . . . with one climber especially for the right and the other for the left . . . they have an extra wide stirrup for greater arch support.

Leg irons are tough and dependable, yet flexible and tapered in width and thickness. Ankles and calves get better support . . . chafing is practically eliminated. And the scientifically offset shank brings gaff in proper line with leg bone, providing real security . . . solid comfort.

"Pole Master" Climbers are forged from high quality, special alloy steel. A wrought, triangular-shaped ring at ankle assures proper set of ankle strap and provides additional comfort . . . safer, longer strap life. "Pole Masters" . . . like all Klein climbers . . . are individually tested and suitable for linemen of any weight.

1945 POLEMASTER CLIMBERS Riveted Top Wrought Loop, Triangular Ring at Ankle (average weight) 2⅞ lbs. per pair. (With this Climber, use Ankle Strap No. 5301-16 or No. 5301-26).

* *Matched Right and Left Climbers*

ASK YOUR SUPPLIER

Foreign Distributor: International Standard Electric Corp., New York

KLEIN TOOLS EST.—1857 TRADE-MARK REG.

Mathias KLEIN & Sons

Established 1857 — **Chicago, Ill., U.S.A.**

3200 BELMONT AVE. — CHICAGO 18, ILL.

Transformers (620)

A new line of silicone-glass insulated, dry-type network transformers has been announced by Westinghouse. According to the manufacturer, the construction eliminates fire and explosion hazards, and fireproof vaults are not required. These transformers are hermetically sealed by welding and can operate when submerged by flooding.

Units are available in both 5-kv. and 15-kv. classes in 150, 225, 300, 500, 600, 750 and 1,000 kva., three phase. High-voltage switches and low-voltage network protectors can be supplied either mounted on the transformer or for separate mounting. Available on basis of limited distribution.

Blacklight Fixtures (621)

Associated Lighting Service has announced a complete line of fixtures to house the PAR 38, blacklight 100-W, EH4, designed to suit decorative needs of architect and engineer. A bullet-shaped unit comes without louver front (No. 1515) or with louver front (No. 1516), complete with filter and transformer mounted either at unit or for remote location mounting. Unit No. 1517 is recessed completely with an adjustable louver front and is supplied with filter and transformer. The eyeball semi-recessed No. 1518 is available with blacklight filters and transformers.

Strip Lighting (622)

Mitchell has announced a deluxe version of strip lighting in its "Super-Strip" fluorescent unit for individual or continuous row mounting. Width of channel covers an outlet box; lamp sockets are flush with ends of units; "jack chain suspension" feature speeds up installation. Model 3025 uses one 40-watt lamp (low power factor); Model 3026, one 40-watt lamp (high power factor); Model 3027, two 40-watt lamps (high power factor with brick-type ballast).

Slimline Unit (623)

A Slimline unit introduced by Mitchell has two 4-ft. sections designed to couple together to form a single sturdy 8-ft. fixture. Sections slide into individual mounting tracks and are fastened by bolts; installation is said to be an easy one-man job. A matching louver ("trunk lock hinge") unit hooks onto the basic 4-light fixture. It may be mounted flush or pendant, individually or in continuous rows. Basic open-type unit is available with 200- or 300-milliamp ballast.

Lamp Guards (624)

McGill Mfg. Co.'s new No-Rol cage for portable lamp guards features ears formed in the cross wires near the handle, equally spaced at four points on the otherwise old-style circulating cage. The new design prevents rolling and is available on the 8,000 and 7,000 series lamp guards.

Electrode (625)

Airco No. 387 all position arc welding electrode for mild steel was developed by Air Reduction Sales Co. for the E6012 class, and is available in 1/8-, 5/32-, 3/16- and 1/4-in. diameters.

Thin-Wall Fittings (626)

A new line of EMT thin-wall fittings has been announced by Fisher-Armour Mfg. Co. They are Underwriters' approved as raintight.

FIGURE IT IN ALUMINUM

Takes a load off my shoulder

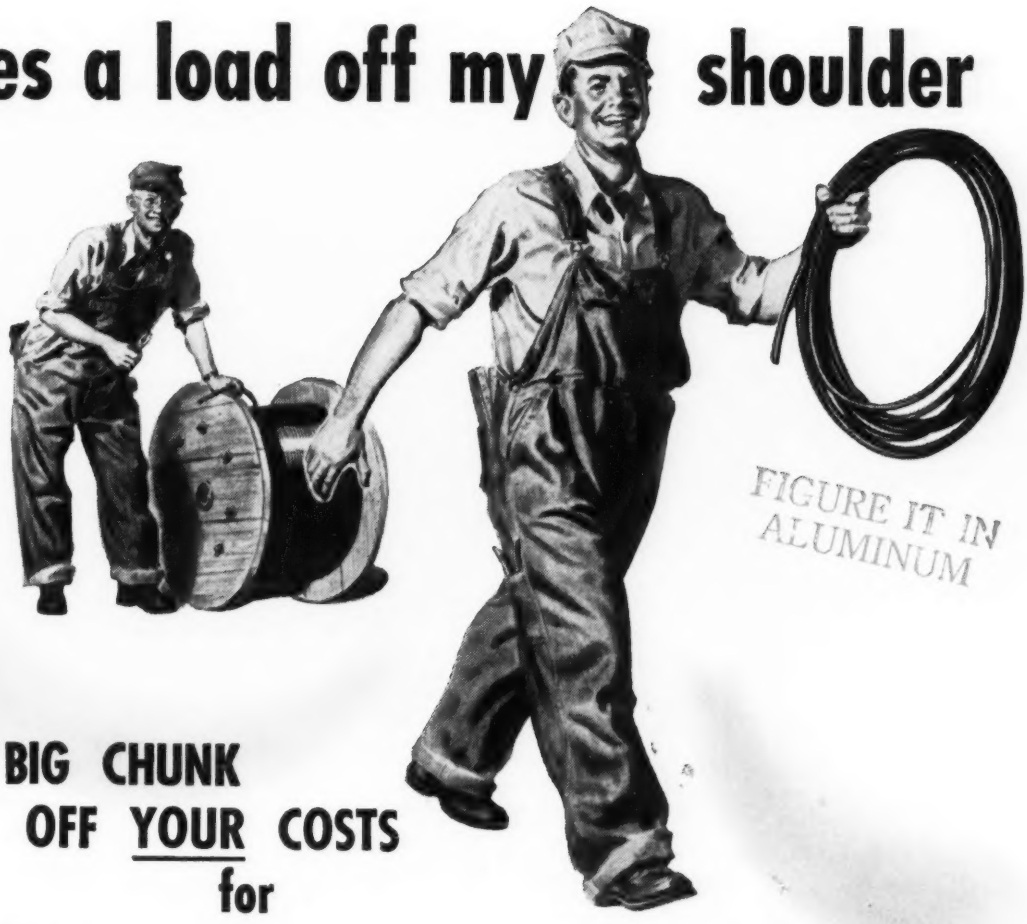
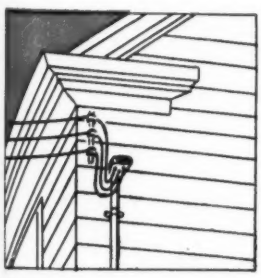


FIGURE IT IN ALUMINUM

. . . A BIG CHUNK OFF YOUR COSTS for service entrances with ALUMINUM



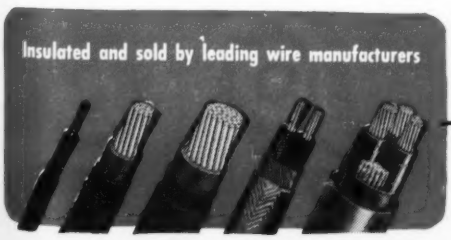
YOUR SUPPLIER HAS IT!

Because the lighter weight of insulated wire and cable with Alcoa E.C.* Aluminum conductor means big savings all along the line—including service entrances!

First costs show big savings. Freight costs are lower. Handling and stringing are faster. Mechanical joints are easy with standard connectors for aluminum—soldering, too, with Alcoa Solder and Flux.

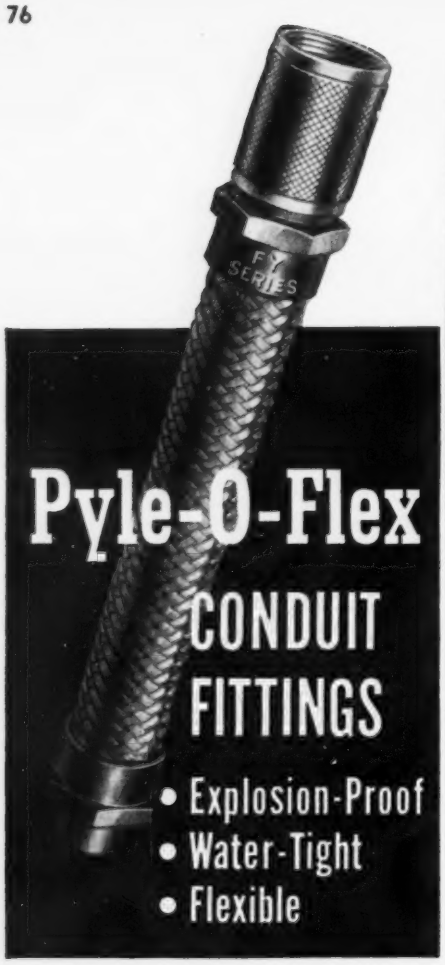
Alcoa makes light, strong, conductive E.C. Aluminum, which leading wire and cable manufacturers draw, strand, and insulate, and sell under their own trade marks. Your wire and cable supplier has it now. ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh 19, Pennsylvania.

*E.C.: *Electrical Conductor* Aluminum



ALCOA EC ALUMINUM

FOR ELECTRIC WIRE AND CABLE



Pyle-O-Flex patented flexible fittings allow a neater installation without the troublesome and costly bending and fitting of rigid conduit. They are ideal for wiring of gasoline pumps, explosion-proof floodlights, motors and other equipment in hazardous locations. Also used for watertight installations of many kinds. Flexibility allows for adjustment of lights if necessary after installation. Flexibility also protects connections against motor vibration.

Pyle-O-Flex Explosion-proof flexible fittings are available in a full range of sizes and standard lengths. Can be used with Pylet explosion-proof elbows and unions.

Consult your Pylet Catalog for complete listings.

THE PYLE-NATIONAL COMPANY
SINCE 1897
1364 N. Kostner Avenue, Chicago 51, Ill.
PACIFIC COAST SALES OFFICE
1302 Hobart Building • San Francisco 4

BULLETINS ETC.

Conduit Catalog (627)

A 64-page catalog and handbook for rigid steel conduit is announced by the Spang-Chalfant Division of the National Supply Co. A feature is the description and illustrations of the manufacturing processes employed at the Spang-Chalfant plant in making three grades of rigid conduit in sizes ranging from ½ in. to 6 in. Another feature of the catalog is a 37-page section of reference material and tables for electrical contractors and users of conduit. This includes standard specifications for rigid steel conduit and fittings, and a list of standard specification numbers for accessory parts. Many tables of electrical data, definitions of terms, electrical symbols, examples of computing conductor sizes, and related condensed information have been brought up to date and expanded from an older edition of the book.

Radio Frequency Heating (628)

A 12-page booklet describing the application of radio frequency heating to the woodworking industry has been announced by the Westinghouse Electric Corp. The booklet contains photographs and drawings of the units in operation, and shows different methods of placing the electrodes to obtain most effective results for various requirements. Also described and illustrated are the six standard size r-f heating units especially adaptable for woodworking applications.

Lighting Equipment (629)

Day-Brite has two new releases on lighting equipment. Form OD-227 includes data on troffer plaster frames. Data Sheet 553 covers a revised listing of continuous one-lamp light strip, using the small cross-section channel.

Path Lighting (630)

No. PL-2 bulletin on its Pathfinder light has just been released by Cannon Electric. Covering the various features of the light which is designed to illuminate steps, walks, driveways, parks, porches, small airports, etc., the new 4-page bulletin shows views of two model modern homes using the light.

Fittings (631)

A "pocket edition" catalog, containing data on the Wagner Malleable Products line of E.M.T. fittings and entrance heads has been released. This 8-page, two-color folder (48-A) illustrates, describes, and presents complete tabular data on the principal items by Wagner.

Substations (632)

Allis-Chalmers multi-circuit unit substations are covered in a 16-page bulletin released by the company. The new bulletin describes construction details of three transformer types —oil-filled, "Chlorextol" liquid-filled and dry-type. Also described are construction highlights of the load ratio equipment and the metal-clad switchgear.

Lighting Merchandise (633)

Sylvania Electric Products has issued "The Right Ways to Light Your Merchandise," a guide to moving more goods at a profit by means of lighting. Based on the principle of area brightness control, evolved by Sylvania through field studies and engineering, the 24-page manual describes how carefully controlled and correctly proportioned brightness levels in five lighting areas will result in sales-provoking displays.

Loose-Leaf Catalog (634)

A comprehensive 68-page loose-leaf catalog describing and pricing electrical supply, repair and maintenance items manufactured by 19 manufacturers is available from Tri-State Supply Corp.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

600	601	602	603	604	605	606	607	608
609	610	611	612	613	614	615	616	617
618	619	620	621	622	623	624	625	626
627	628	629	630	631	632	633	634	

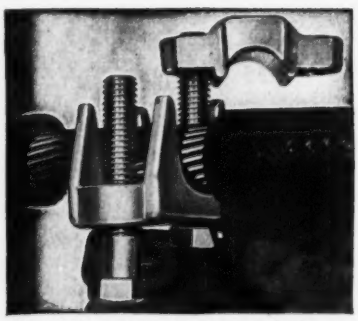
Name ..... Company* ..... Title* ....

Address .....

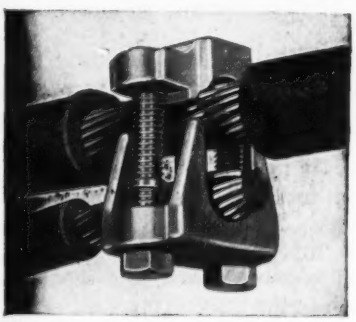
* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

More Efficient Connectors For Large Conductors

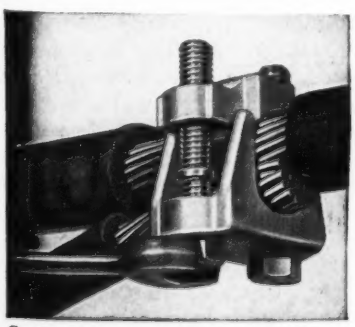
Save Up To Half Your Cost



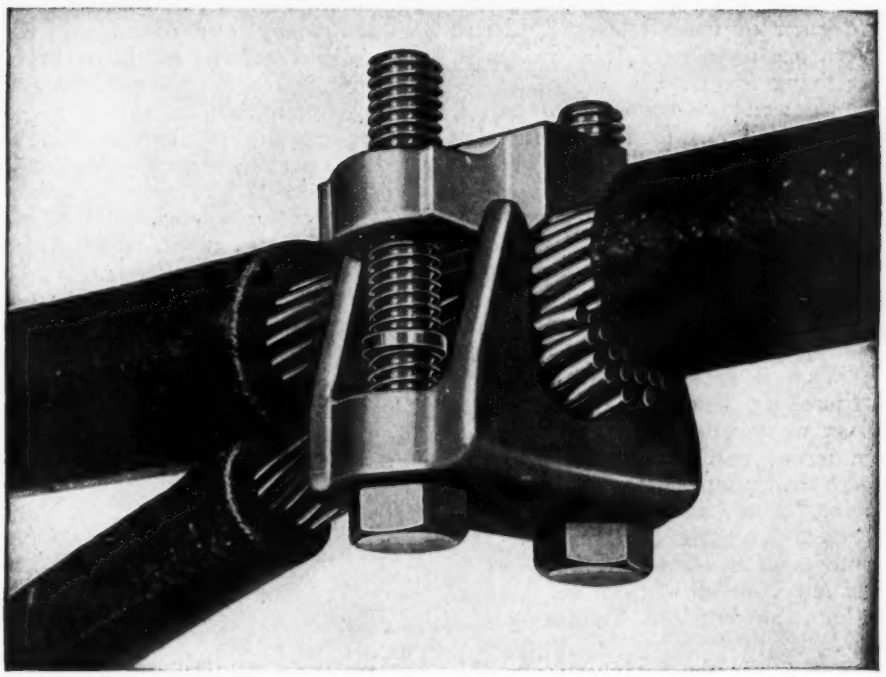
After fitting connector on conductor as above, place upper clamping member in position as shown below and partially thread free cap screw into it.



With connector in position on conductor as shown, install tap-off wire and equally draw up cap screws.



Continue to draw up cap screws until connector is securely tightened. Note easy access of wrench to heads of cap screws.



MATTHEWS UNICLAMP CONNECTORS

U. S. PATENT 2,426,857

You can cut your initial costs on large size wire connections up to 50% by using Matthews Uniclamp Connectors.

You can get them for 1/0, 2/0, 4/0, 350 MCM, 500 MCM and 750 to 1000 MCM stranded copper wire—or 1 ACSR to 1033 MCM ACSR aluminum wire. They can be furnished for copper to copper, aluminum to aluminum, or aluminum to copper and other bi-metal connections. You can install any size with an eight inch wrench and get permanently tight and trouble free connections. They will accommodate two conductors of their rated size or one of rated size with one or more smaller tap-off wires as small as 8 solid. They can also be easily installed by means of hot line tools. You will note the large contact surfaces of the silicon bronze castings and the large strong Duronze cap screws. They are the reasons for better connections; no loosening of connectors; no overheating or burning of connections; less friction due to strong, but small diameter bolts, hence greater pressures on conductors than for corresponding split bolt sizes; they will cost you up to 50% less than comparable sizes of split bolt connectors.

The **one-piece-to-handle** feature is strongly patented and the name Uniclamp is copyrighted. Use genuine Uniclamps and get all the above advantages.

Send in your orders at our risk of your approval.

FOR FURTHER INFORMATION REQUEST BULLETIN 206

W. N. MATTHEWS CORPORATION

3722 FOREST PARK AVENUE ST. LOUIS 8, MO.

ENGINEERS and MANUFACTURERS SINCE 1899

ELECTRA'S HUSBAND

TAX EQUALITY FOR PROFESSIONAL MEN

"WHAT are we going to do with the money you save from the reduction in income taxes?" Electra asked one night recently as we sat in the living room reading.

"We won't save enough to put in your eye," I answered petulantly, because I was deeply engrossed in Kinsey's best seller on male sex behavior.

"Why it says right here in the *News* that a person in your income bracket ought to save nearly thirty per cent," she continued. "I could buy a lot of things I need with that much money."

"What it doesn't say is that because we live in California where we have been able to split our income and file two returns, we've had the benefit of that saving," I said with resignation. "Only a few states had the advantages of a community property law. Now all of them get it without any of the disadvantages."

"I thought that maybe we could save a little money if the tax reduction amounted to anything," Electra mused. "We certainly don't seem to be getting ahead very fast nowadays."

"Part of it is because Congressmen showed little interest in loosening the tax squeeze on technical and professional people," I said. "Their major attention was focused on relief for low-bracket wage earners and top-bracket investors. But I just heard of a practical proposal to help salaried people in the middle brackets. It came from Harry Silverson of J. K. Lasser & Co., the firm that audits our books. He wants to let people like us average our income for tax purposes over the long period of apprenticeship, responsibility and retirement instead of concentrating tax payments during the period of maximum earnings as we do now."

"I don't see how that would help," Electra commented.

"It's simple when you analyze his proposition," I continued. "There was a time when a hard-working engineer or scientist could save enough of his salary over a normal working life to provide a nest egg for his family. Today's high surtax rates plus the rising cost of living make this pretty nearly impossible.

"At every turn the federal income tax works against the technical man trying to build up savings. He can't benefit from a lower corporate tax rate as can many owner-managers who draw limited salaries and leave surplus earnings in the company treasury. If he pays premiums on an annuity as we do, they are not tax deductible as are those paid by a corporation for its owner-executive. The lower tax rate on capital gains is no help to the man whose income is all salary or professional fees."

"I've told you it would be smart to quit and start a little business of your own," Electra interrupted. "Glenn Johnson said the other night that if a man can make money for his employer, he ought to be able to make as much or more for himself."

"We settled that a long time ago," I said. "Let me finish my tax argument. Our system of taxing income a year at a time works a real hardship on those with professional training. The average wage earner increases his earnings relatively little after he gets out of high school and finds his niche. He keeps close to the same level even in his declining years. Similarly the beneficiary of a trust fund can draw roughly equal income all his life.

"But in the case of a professional man, his earnings don't begin at all until he has finished extensive schooling somewhere in his middle twenties. Then he has some lean years getting started. When his earnings do rise sharply, they are likely to be concentrated in the period from 35 to 50. In those years he is taxed on income at much higher rates than would be the case if the income were spread over his working lifetime.

"And this tax inequity hurts most in these days of high cost living. Engineers, scientists, accountants and junior executives don't get a pay raise every time prices rise. The result has been to make saving difficult and retirement often impossible for the professional or managerial worker. Today he stays on the job long past retirement age in order to meet the family bills.

"How does your auditing expert propose to change this?" Electra asked.

"Quite simply," I said. "First let each taxpayer set up his own pension fund by setting aside each year up to fifteen per cent of his earned income or $10,000, whichever is less. This amount would be invested in special non-assignable, low-interest government bonds. The bonds would be redeemable at any time, but would mature, in any case, ten years after the death of the purchaser. The amount invested would be excluded from gross income in the year invested. The amounts paid on redemption would become taxable in full at redemption.

"The effect of all this would be to reduce taxable income in the years of high earning power and increase it in retirement years, thus averaging income over the entire period.

"The mechanics would be simple. The bonds could be sold by any bank. At the time of sale the bank would furnish a receipt and this would be attached to the income tax statement to support a deduction of the amount from gross income. On redemption, the bank would withhold a fixed percentage as income tax and furnish the regular tax withholding receipt. The difference in tax, if any, would show up on the purchaser's regular year-end tax statement."

"But wouldn't such a plan take a big cut out of income taxes?" Electra inquired.

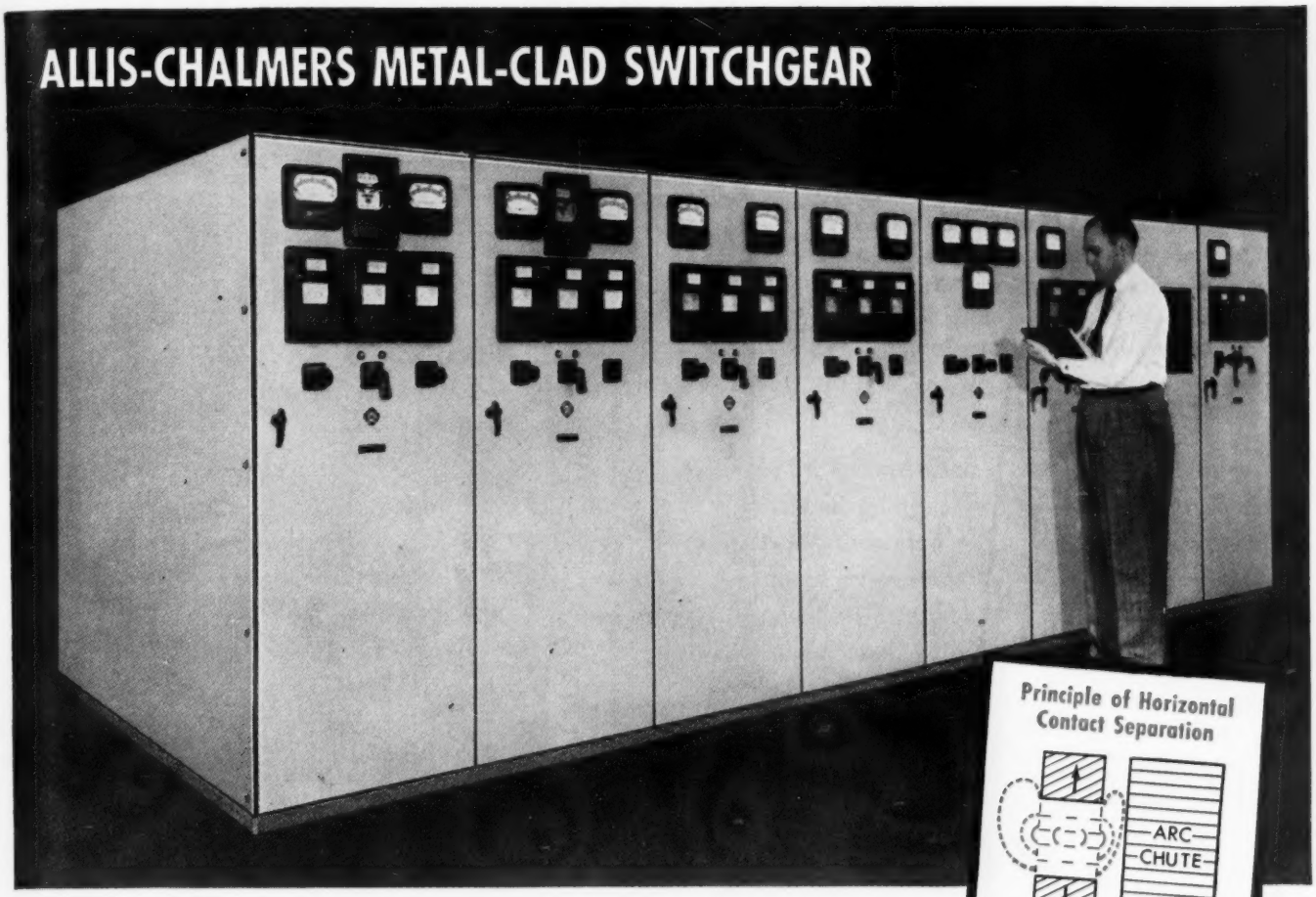
"Not as much as you might think. The money invested would be taxed ultimately, whatever happened. And the plan would have a number of advantages as far as the national economy is concerned."

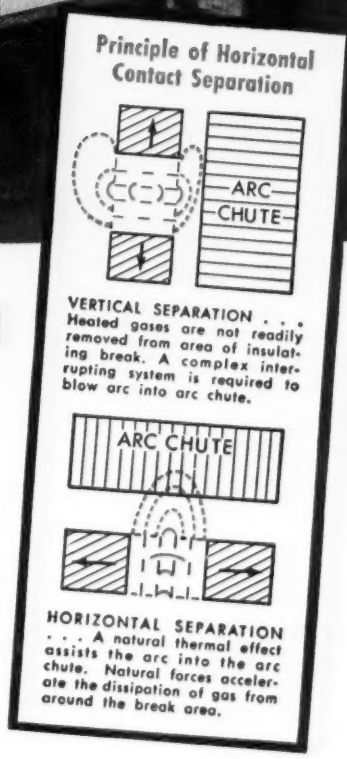
"What are you going to do about it?" she asked.

"Try to interest as many technical and professional people as possible," I answered.

"I guess I'll tell the women," she concluded, permitting me to go back to Kinsey.

ALLIS-CHALMERS METAL-CLAD SWITCHGEAR




Principle of Horizontal Contact Separation
ARC CHUTE
VERTICAL SEPARATION . . . Heated gases are not readily removed from area of insulating break. A complex interrupting system is required to blow arc into arc chute.
ARC CHUTE
HORIZONTAL SEPARATION . . . A natural thermal effect assists the arc into the arc chute. Natural forces accelerate the dissipation of gas from around the break area.

Horizontal Arc Interruption

Gives You Long Contact Life, Positive Interruption, Easy Contact Inspection

IN A RECENT SURVEY, engineers named horizontal arc interruption as a top feature of Allis-Chalmers metal-clad switchgear. It's easy to see why.

Horizontal arc interruption minimizes contact burning, adds contact life, because arc is forced up and away from the contact points. You can be sure of positive interruption because the arc itself generates the heat to create the natural thermal effect that assists arc into arc chute. Contacts are easily inspected by removing bolts and raising arc chute.

This kind of sound engineering throughout A-C switchgear insures the first requirement of protective electrical equipment — dependability. For more information, write: ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2490

HERE ARE 5 OTHER PREFERRED FEATURES:

RUGGED CONSTRUCTION . . . rigid, self-supporting structure of steel angles and formed plates is lap-welded. Only two full length channels required for simple four point support. Result: only four point alignment necessary.

A-C DESIGNED arcing contacts of high melting point alloys minimize burning, assure low maintenance, long life under repetitive duty.

CONTACT FINGERS on removable element permits easy inspection and maintenance without de-energizing the main bus.

PREDICTABLE low installation costs . . . unit is "packaged" ready for connection. Detailed drawings provided for each installation.

ADEQUATE BUS INSULATION . . . no-corona tape, bakelized paper tubing, insulating tape eliminates compound-filled joints. Easily installed in field and removed for installation changes.

ALLIS-CHALMERS builds these circuit breakers: Air Blast, *Ruptair* magnetic air, *Ruptor* oil units, Low Voltage.

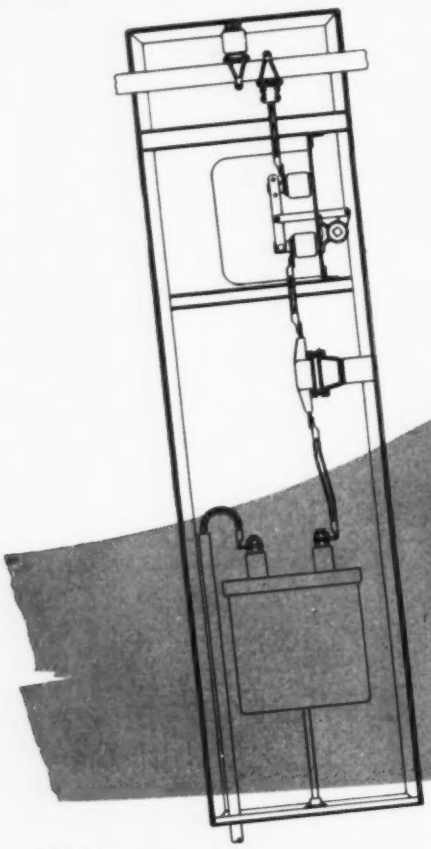
Ruptair and *Ruptor* are Allis-Chalmers trademarks.

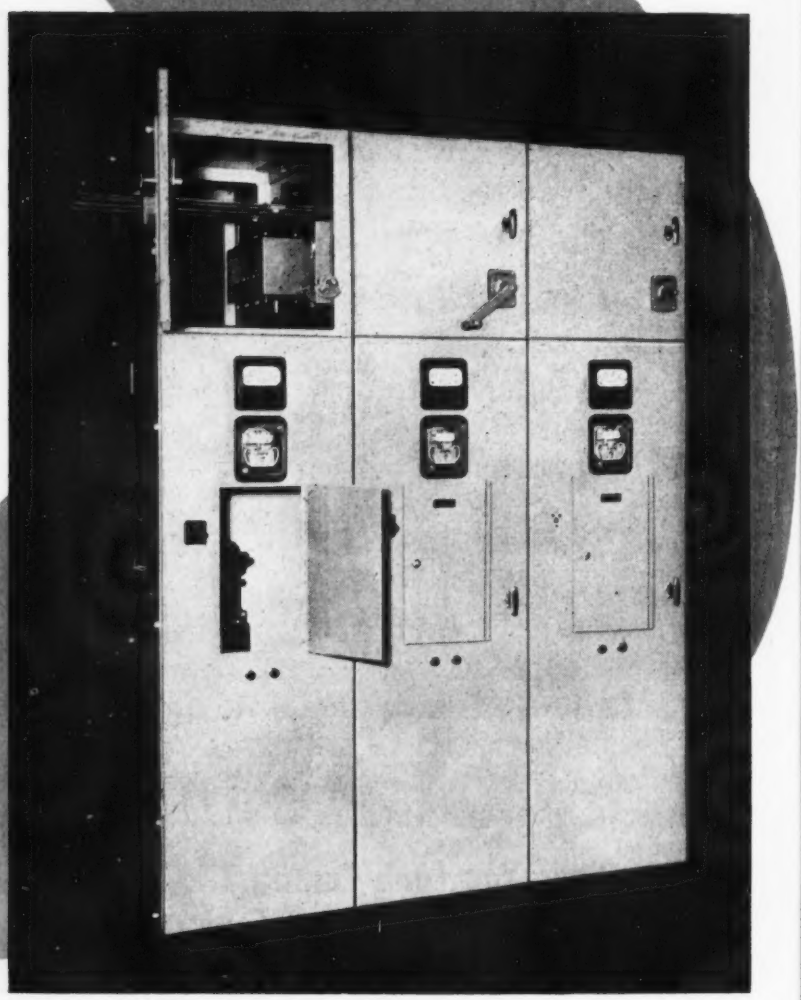
ALLIS-CHALMERS

First in the U. S. with Metal-Clad Switchgear

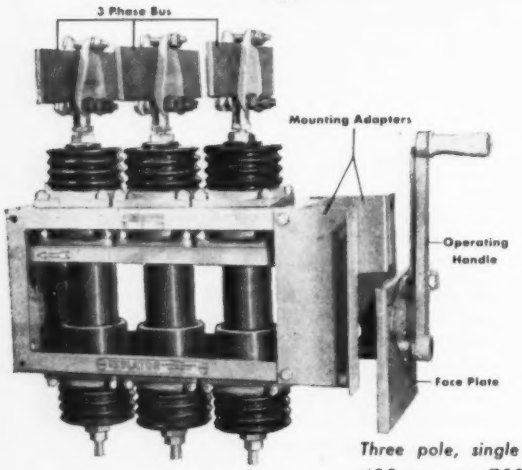
ISOLATORS SAVE HARD TO GET MATERIALS TOO!

In addition to its space saving and other excellent features, ISOLATORS will help save scarce materials. For convincing facts, compare the cross-sectional view of the conventional cubicle to the left with the Three "E" ISOLATOR equipped cubicle switchboard at the right.





Three sections of a cubicle switchboard equipped with ISOLATORS



Three pole, single throw, 400 ampere, 7500 volt ISOLATOR having top studs equipped with clamps for carrying bus.

We list here the equipment saved per cubicle section by using an Three "E" ISOLATOR.

- 3 Bus supports
- 3 Tee connectors
- 3 Connecting leads, bus to disconnect
- 2 Insulating barriers
- Approximately 100 pounds of steel due to smaller cubicle
- Several hours labor used in fabricating and assembling surplus material

Insist on having your next cubicle switchboard ISOLATOR equipped. We will be glad to cooperate with your switchboard builder to see that you get the maximum benefits offered by the ISOLATOR.

Ask for Bulletin 135

ELECTRICAL ENGINEERS EQUIPMENT CO.
MELROSE PARK, ILLINOIS

JUNE 1948 Vol. 100, No. 6

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

NO TIME FOR COMPLACENCY

IN all the annals of American industry there is no business more dynamic than the electrical industry. Take any gage for comparison — imagination, courage, inventiveness, enterprise, energy, skill or confidence — and our business will measure up to or exceed the best of the others. Perhaps this dynamic quality stems from the product around which the business is built. Electricity itself is energy — boundless, purposeful, powerful—ever-present in the wires that harness it, ready for any task it may be called upon to perform. This dynamic character has been present from the industry's very beginnings when its pioneers staked reputations and resources on their faith in the industry's destiny.

The business has never been a place for those seeking a sinecure. Those who have looked to it for a soft spot to sit and coast have been automatically liquidated. Or if not, then the parade has passed them by. And time has not changed the pattern in any respect.

This dynamic quality was never more apparent than it is today. Those who might doubt this need only look around to be convinced. The challenging problems are as many as at any time in the past. The profitable opportunities are equally great. The courage and zeal to tackle the problems is not diminished. And the enterprise and energy to capitalize on the opportunities is everywhere evident. Consider the following examples.

With unprecedented customer demand taxing the industry's ability to serve, it is meeting the emergency with unparalleled engineering and operating ingenuity. And to forestall future crises of this type it has undertaken to increase its capacity by half within the next four years. With banking experts questioning its ability to finance such a vast construction program, it is going ahead anyway. The money will be forthcoming.

Inflated costs—for labor, for materials, for equipment — coupled with skyrocketing taxes, have been met with operating economies so that the price of electricity to the customer remains the same. The continuing problem is to keep that record secure.

With pressure for gains bringing labor strife to other businesses, this industry has, on the whole, been free from trouble. Reason is that it has paid fair wages and has provided ideal working conditions. However, this does not mean that internal human relations are perfect.

Because a shortage of its basic product—electricity—curtailed market development, it has concentrated its selling efforts on the replacement market. Thus it keeps alive its sales cunning and sales ability for those future days when its market will be unlimited.

Government regulation, the threat of federal competition, inflation, material shortages all pose their problems. And all are being met with initiative, perseverance and determination.

Under such conditions there can be no complacency or self-satisfaction. For proof the following pages of this convention issue of ELECTRICAL WEST outline some of the industry's complexities and indicate how they are being met. They are put into the record so that young and old alike may take inspiration and renew their faith in the dynamic future and ultimate destiny of this great industry.

George C. Tenney

EDITOR

ACCEPT THE CHALLENGE

H. H. COURTRIGHT, president of the Pacific Coast Electrical Association, tells the electrical industry in this fast-growing West. Problems of the present seem small to him when viewed in the light of future opportunities. Faith in the industry, a willingness to defend it and the ability to inspire the youth who will lead it in the future are the challenges that must be met today by all of its branches

IN ALL the recorded history of mankind, no people has ever achieved the advancement in science, in production, or in higher living standards that we have achieved in this country, and no section of the country has equaled the record we on the West Coast have made. The eyes of the entire world are on the Pacific Coast. There are more and greater opportunities opening here every day than ever have been available to so many people before.

Our electrical industry in all its branches has one of the most outstanding records in our American free enterprise system. It has consistently furnished a better product with better service at a lower price. In the last war the contribution made by the entire industry was without parallel. It delivered its product in increasing quantities, with a minimum of priorities. Its record of contribution to general welfare during this period is one of which all branches can well be proud. With politicians in high places discussing labor relations and legislation for the benefit of the so-called "down-trodden" worker, the industry again has displayed its leadership by furnishing good working conditions, wages, hours, and safe and clean working establishments.

These are trying times for the electrical industry. We all know it and we all must face it. Every branch of the industry is faced with some form of the same problem, namely, a temporary inability to carry on the aggressive selling and building program we normally would have under way. But these times are temporary. This electrical industry of ours is growing fast and it must grow to keep pace with the growth of population on the Pacific Coast. We are experiencing the greatest mass migration in the history of this nation. In California alone, state estimates indicate that 21,000 new residents are arriving here each month and this is proportionately true of other Western states.

What does this mean to us?

First of all, it presents a challenge to provide the equipment and the service these new residents desire, plus the equipment and electricity needed for the businesses, factories and transportation systems that increased population makes necessary. Equipment is not yet plentiful and electric service has been hampered by an inability to maintain a rate of growth equal to the growth in population, plus an unprecedented drought. The kilowatt demand for electricity increased as much in the last five years as it did in the previous twenty years, but the war emergency prevented normal construction to meet that growth. These factors are only temporary and will be overcome, but they have slowed down our growth. The challenge is still there to service our customers and it is our job to meet it in every way we possibly can.

Secondly, we cannot regard this temporary situation as permanent. It is our job and our job *now* to make plans for aggressive growth in the future. It is our job to prepare ourselves for the sales effort that will be necessary when equipment is more readily available. Many of our new residents have had little or no experience with Western standards of living. They do not know—as we know—to what extent our high standards depend upon electricity. They must be told and sold. They must be educated in our way of using electricity to make their home life and work life easier. This is essential to keep our industry in synchronism with the ever-growing West.

Thirdly, these new residents are not familiar with Western methods and Western trends of thought. They are not familiar with the institutions that have made the West what it is today. Yet they, because they are Americans like the rest of us, have the right to a voice in how we progress. They can express themselves with the dollars they spend or with the ballots they cast, and it is vitally necessary for the future that these new neighbors of ours have the fullest possible information on our institutions and our customs before they exercise their suffrage. Lacking that information and understanding, these new citizens of the West are sufficiently strong to condemn us to ill-advised experiments from which we would be a long time in recovering. It is our job, therefore, to educate these new people, as well as those older residents who have not stopped to analyze and evaluate our institutions and methods nor to think through the scatter-brained proposals that are continually being advanced. This is a big job and is one of the most important tasks facing us today. It will require the coordinated effort and intelligence of every one of us, if we are to be successful at it.

Yet there are those here and throughout the country and even within our government who would urge us to think unsurely of ourselves and our future. If we listen to some of them, it would appear that we have built the highest civilization and the freest people the world has known by doing everything wrong. They would tell us that we must substitute the dictatorship of the few for the free working together of the many—that we must cast aside and disown the competition and individual initiative that have made us what we are under a system of free enterprise.

This electrical industry of ours is only 65 years old but you can see all about you the influence it has on our daily life. This industry was built by risk capital and risk effort. Many men and women worked hard to bring us to this point of success. Because we are an essential and vital part of the free enterprise system, it is our job to carry on the task of educating our neigh-

bors, new and old, in the benefits and blessings that system offers each one of them as well as each one of us. There is plenty of room for expansion. There is room to grow. We need new men and new ideas. The door of Western opportunity is open to any man who has the vision, the courage and the energy to take his place beside us and build with us for the future.

I like to see a man proud of the industry he is in, and I like to see a man so active in his industry that the industry is proud of him. You and I have our day in the sun. But what will happen when that day is done? Who will follow us? Sooner or later we must each one of us give way to new hands and new heads.

It takes resourceful, responsible leaders to attract trained, responsible men to our electrical industry and to inspire them to continue our way of building.

We believe in the industry we have built. We believe in the foundations that were laid down for us and we believe in the structure we have erected on those foundations. If—and here we must analyze our accomplishments coldly and dispassionately and determine if they are good and worth perpetuating—our industry and our institutions are to be continued along the lines we have followed, we must make sure that those who succeed us have the same vision and the same faith that we have. It is not their job to educate themselves to follow us. It is our job to educate them and to inspire them.

We have a vast responsibility—to them, to our industry and to ourselves—to make certain that they, too, understand what this industry means to the development of the West and the future that each of them has in the industry and in that development.

The future belongs to those who plan for it. This year is both an opportunity and a challenge. We must individually and collectively eat, work and sleep the task that is before us. Working together we can meet the emergencies of the present and build soundly for the future, and I can assure you that the future is bright—not only for us—not only for our industry, but it is especially bright for all the West. We can have our share of that future by continued cooperation, by working hard and playing hard; by keeping alert, and by backing up all branches of our industry with our time and talent—thus meeting the challenge of our rapidly growing West.

STAYING OUT IN FRONT

is the major task of the electrical industry in the Rocky Mountain region, according to J. A. BULLOCK, president of RMEL. Even though customer demand is high and generating facilities are over-taxed, the industry is concentrating on the Go All-Electric Program of selling its goods and services to the public. Aim is to insure full use of the 350,000 kw. of new capacity planned for future installation in this region

ONE of the major problems confronting the Rocky Mountain area, which is undoubtedly similar to other parts of our country, has been to try and restore reasonably normal reserves between peak loads and total installed electrical generating capacity. Our region was generally very fortunate during the war to have reserves sufficient to keep ahead of the rapidly expanding load incident to the various war industries and training camps. Although considerable reduction in demand was anticipated at the conclusion of the war, this did not materialize appreciably, and soon the increasing population growth and influx of small industries resulted in even greater demands than were developed during the war.

A recent power survey conducted in the state of Colorado, including reports from the majority of the utilities, involved the following figures. In 1947 there was an installed capacity of usable generating facilities of 355,000 kw. In the year 1948 there will be completed additions to existing generating units in the amount of 57,500 kw., or an increase of 16% in the over-all generating facilities of private and municipal utilities. Plans for the next five-year period contemplate increasing the total installed capacity of generating units to 700,000 kw.; 153,000 kw. of this proposed increase will be furnished by the United States Bureau of Reclamation in hydroelectric projects. The balance of 192,000 kw. will be provided by private and municipal utilities.

As an example of this increased demand in the use of electricity, the May 13 bulletin of the Denver Chamber of Commerce reported that the first four months of 1948 compared with the corresponding period of 1947 for the Denver area show an increase of 4.73% in the number of electric customers and 22.91% increase in the kilowatt-hours consumed.

In some parts of our region, reserve margins in capacity are still very limited and little or no promotional work is being done. In the majority, however, promotional work is now being carried out quite extensively and the Go All-Electric Program of the league is cooperating with this effort.

Electrical shows have been conducted in many sections of our region, including Brush, Casper, Colorado Springs, Fort Morgan, Monte Vista, Montrose, Rapid City, South Dakota, Sterling, and others and one is now in progress at this writing in Grand Junction.

In connection with the majority of these shows, the league has arranged for adequate wiring promotion, and excellent support to this program is being given by the Rocky Mountain Chapter of the NECA.

Our promotional and sales training activity in many instances has been carried on cooperatively with the Rocky Mountain Branch of the NERA. In fact, the regular monthly electric

dealers' meetings in Denver have in each instance been joint programs with the local members of NERA and have worked out quite successfully.

The annual spring conference of the league, held in Santa Fe, N. M., last month, was one of the most successful and well attended conferences that has been held in several years. Although this had been planned as an engineering and accounting conference, in addition the Santa Fe meeting included a presentation of our mobile radio communication committee, the Go All-Electric committee, and a very interesting panel discussion on customer relations. It was felt desirable again to get down to grass root fundamentals and to find out just what we were doing and what we could do to improve continually our services to our customers from all angles. It is planned to continue this type of question-and-answer session at our fall convention, at the Colorado Hotel, Glenwood Springs, Colo., Sept. 12-15.

Present plans of the league include general activities for the balance of this year: (1) a joint RMEL-NECA picnic, (2) the annual RMEL golf tournament for the L. M. Cargo Cup, (3) the annual fall convention, (4) an extended sales training activity, (5) an electrical exposition, (6) the revival of our annual Christmas lighting contest, both for the residential area and the business district.

In common with the electrical industry in general, the Rocky Mountain area was faced with a two-fold problem. One was how to meet successfully the serious inroads made by other fuels, particularly in the rural electrical field and, the other, the most effective means of giving impetus to local dealer appliance sales.

The Go All-Electric Program prepared by the National Electrical Manufacturers' Assn. was chosen as the most flexible type of program that could be applied to the league area. Through distributor and utility cooperation, the NEMA plan was developed into a major two-year program under the sponsorship of the Rocky Mountain Electrical League.

General publicity is provided by seven strategically selected radio stations, two color ads appearing once a month in *Western Farm Life*, which has an 86% coverage of farms in league territory, and 104 separate newspaper ads each month carried by the local utility. A full-time field representative is employed for arranging local dealer meetings and general administration of the program. The use of NEMA-prepared material such as decals, promotional cooking and water heating booklets, self-mailers, stuffers, sales handbooks, newspaper mats, etc., is promoted wherever possible, supplemented by additional locally prepared material as is thought desirable.

With the trend away from active competitive utility merchandising, the program is insuring future utility load growth and contributing to a healthy cooperative relationship between the utility and local dealer-contractor groups.

With utility kilowatt-hour sales running greatly in excess of the corresponding period in 1947, which in turn was a substantial increase over 1946, and with the continued fine cooperation we have been receiving from all branches of the electric industry, the future prospects appear very promising for our region.

NORTHWEST PARADE

is the description T. E. ROACH, president of the Northwest Electric Light and Power Assn., applies to the economic and population development that currently is taxing the power-producing facilities of that region. The same type of cooperation, engendered by men who know their jobs and their responsibilities, that enabled the electrical industry to meet past commitments will keep it in vanguard of today's march

THE continuing growth in population and industry in the Northwest states since the war is one of the major economic phenomena of the region and of the times. Though fully understandable on analysis, the degree of this growth, its rapidity and duration, were scarcely anticipated by any of the prophets, so that the most optimistic postwar reconversion plans have been somewhat outdistanced. As this situation impinges on the electrical industry, we all find ourselves in the vanguard of a great parade.

Far from there being any real indication of a recession, we find population still pouring into the region, new businesses and industries springing up, old businesses expanding, a continuing high level of employment, and the boom definitely on. This has put an unprecedented demand on the utilities in the region, overloading generators, lines and transformers, and forcing orders for equipment which the manufacturers can't fill promptly, so that by the time the installations are made the demand has moved ahead and we haven't gained ground as fast as we had hoped. Nevertheless, the increasing loads have been carried without curtailment through the cooperation and resourcefulness of all members of the Northwest Power Pool.

This growth has meant, too, an abnormal need for investment capital in a tightening money market. Along with the heavy demand for materials for plants has gone a rising price trend while the increased use of power by customers has resulted in a lowering of the average price per kilowatt-hour received for our service. What a challenge this presents to our industry!

However, the long-range program of providing capacity to care for the increasing load is well on its way to solution, so that a condition of normal reserve may be expected in from three to four years. After a war-enforced recess in the construction of new capacity on the part of the private companies, we find many of them now actively engaged in the installation of new power facilities—Pacific Power & Light Co. at the Merwin project, The

Two of the conference sessions of the Northwest Electric Light & Power Assn., Business Development Section, at the recent annual meeting in Victoria. (See p. 112) At left D. B. Leonard, Pacific Power & Light Co. sales manager, discusses employee discounts on appliances at the Manufacturers, Wholesalers, Dealers and Contractors Bureau meeting, of which Joe Krivanek, electrical contractor, Longview, is vice-chairman, and Dean Pulsifer, Westinghouse Electric Supply Co., Seattle, chairman. At right, the Rural and Farm Bureau in round-table session. L. N. Roberson, Seattle radiant heating engineer, at the center of the table, far side, is discussing greenhouse heating and humidity control. Ralph Gram, bureau chairman, B. C. Electric, is at left end, his back to camera when photographed

Washington Water Power Co. at Long Lake, The Montana Power Co. at Kerr Dam, Utah Power & Light Co. at Oram, B. C. Electric Railway Co. at Bridge River, and my own company on the Snake have developments under way totaling in the aggregate approximately 500,000 kw. on which work is being aggressively carried on.

Concurrently with these additions to generation and transmission, all retail power agencies are engaged in extensive additions to enlarge and strengthen their distribution systems. The program calls for capital expenditures greatly exceeding that in any like period in the history of the region.

While the long-range regional program is well on its way to completion, the power people in the western part of the area face a somewhat difficult supply problem this coming fall and winter. However, the power pool members are working cooperatively on plans to tide that section over any emergency by skillful coordinated operation of all available facilities, as they did so well during the war period.

In meeting all these problems of construction, operation, and financing, management is finding able support from a great body of trained men with the know-how accumulated through many years of experience. I cannot say too much for the unusual ability and fine morale of the people of our industry. I feel that this happy situation is due, in part at least, to the way in which we have learned to work together through our associations, and here I make particular reference to our own all-industry organization, the Northwest Electric Light & Power Assn.

The section meetings held during the association year soon to end have contributed much. The conference of the engineers and operating men in Spokane in April attacked the problem of carrying the load, and a foundation was laid for cooperative plans that will meet the almost certain power problems of this coming winter in an orderly way.

The more recent Business Development Section meeting in Victoria served to keep utility sales people alerted to the role they must play while they mark time awaiting the word to start their programs of all-out load building. Manufacturers, wholesalers, dealers and contractors learned of the vast replacement market for appliances created by aggressive sales programs of the past and intensified by the wartime lapse in the manufacture of these appliances. All were urged to join forces in promoting the sale of adequate wiring to the public—as a necessary prelude to the kind of electrical living the industry looks forward to providing.

The accountants, meeting in Spokane recently, tackled the problem of how they might better aid operating departments and management in solving the many problems of operation and finance. More efficient operation was the theme of the conference, which also stressed improved practices in relations with customers.

The personnel people will meet in Medford soon after this article goes to press to review the problems of employee-management relations, the proper administration of which is so essential to the smooth and economical functioning of our organizations.

Many executives have failed, I believe, to appreciate fully the great contribution of this association work to the rapid and efficient progress of our industry and to the solution of some of the difficult problems of these times. These would not have been possible without industry team work and team work is best fostered by active sponsorship of and encouragement to these association meetings, where utility people gather and freely exchange experiences and individual ideas with resulting great benefit to their respective organizations.

Another major association event of recent months has been the moving of our Research Advisory Service director and his staff from Spokane to Portland to be combined with the office of the executive secretary in that city. This move is designed to obtain the benefits of economy and efficiency from a coordinated operation. Research Advisory Service is one of the means through which the utility companies in the Northwest render a plus service to the public by aiding their industrial and business customers with problems of processing, packaging, marketing and management. As time goes on, greater and more effective use of the service will be made and the economy of the region will benefit proportionately.

I should like to take this opportunity, as president of the association, to commend the section and committee chairmen and other stalwart association workers for the services they have rendered in behalf of our industry this year. In the face of many difficulties, they have devised and carried on excellent programs of great value to us all, attacking timely problems with much vigor and intelligence. Through these activities they have provided invaluable aid to utility company management and to the industry generally.

Our industry continues to be a dominant, vital and vibrant part of the region's social and industrial life. We will, I am sure, successfully extricate ourselves from the present squeeze and keep our position in the vanguard of the region's economic march.

NEW U. S. POLICY NEEDED

in financing urgently needed major hydroelectric projects, is the opinion of SAMUEL B. MORRIS, general manager and chief engineer of Los Angeles Department of Water & Power. Self-supporting and self-sustaining water power projects constructed with federal funds to be repaid with interest within prescribed periods should be encouraged. Financing might well be with callable U. S. water power revenue bonds

FOR a long time I have been observing, with concern, the delays and inadequate appropriations by Congress for vitally needed hydroelectric projects for which the United States has assumed the role of planner, designer, financier, builder and owner. Additional generating capacity is of essential and paramount importance to meet increased power demands, particularly at the present time of critically low electric power reserves. This shortage of reserve capacity is nation-wide. It has resulted in actual curtailment of power in several regions, especially in portions of the Pacific Coast which have experienced such a great increase in population and industrial production. Government, by its assumption of complete authority over the richest and most economic main stream hydro sources, must accept responsibility for their development. The government must share with the utilities in the responsibility for anticipating not only growing production requirements of our expanding civilian economy, but for possible war production needs as well.

The national interest in development of our inland waters has progressed from navigation only to irrigation through the Reclamation Act of 1902. Then began an era of small hydroelectric plants at dams and at drops in canals in connection with early irrigation works such as at Elephant Butte, Roosevelt, and Arrowrock dams. These hydro plants were truly incidental to irrigation and were financed out of the Reclamation Fund, the capital cost to be returned without interest. Power from these early plants was generally sold to private power companies at maximum competitive rates. It was soon discovered that the electric revenue was an important factor in the irrigation economy and of great assistance to the irrigation districts in meeting their repayments to the Reclamation Fund.

Soon the irrigation districts discovered that there were greater profits from distributing the power themselves to their own farms, communities and small industries. With this development came competition with, and opposition from, the privately owned power companies.

It was into such a frame of precedents and pressures that the Boulder Canyon project came into being on the lower Colorado River. Here was the first great multiple-purpose water project planned, financed and constructed by the United States to meet the pressing needs and demands of many agencies in southern California for protection from the vagaries of this uncontrolled river. The Fall-Davis Report of 1922 recommended a high dam at Boulder Canyon and the All American Canal. In keeping with tradition, navigation was named with irrigation as the paramount purposes of the project. There was yet no national policy on flood control and other items which are now considered non-reimbursable, such as recreation, fish and wild life, and silt control. This report brought to the fore the fact that, although production of power was merely an "incidental" purpose, such a dam would develop great quantities of hydro power; in fact, the revenues from the sale of this power would be sufficient to pay for the dam and power plant. The fact that this would be low-cost power stimulated interest from both public and privately owned power utilities in southern California. In fact, the Los Angeles Department of Water & Power and the private power companies proposed, themselves, to build a high dam on the Colorado River and promised similar benefits. These proposals were rejected and the United States built the project.

The United States asserted and has maintained the position that it alone can build dams and regulate the flow of the Colorado River, an interstate and an international stream. In spite of this assumption of sole jurisdiction and responsibility, it took California agencies *eight years* to secure passage of the Swing-Johnson Bill, known as the Boulder Canyon Project Act. This delay was encountered in spite of the fact that the cost of the Hoover Dam was to be completely repaid with interest to the United States from power revenues supplemented by a 25-cents-per-acre-foot charge for storage of domestic water supply; and the cost of the All-American Canal is to be returned without interest in 40 years under the Reclamation Law.

The act provided that Hoover Dam should not be built until the Secretary of the Interior should have in hand executed firm contracts sufficient, in his judgment, to provide revenues to retire the cost with interest at 4% in 50 years and at such prices for power "as the Secretary of the Interior may find to be justified by competitive conditions at distributing points or competitive centers."

Policy Changed

Almost immediately after authorization of the Hoover project in 1928 came the depression years, and the idea and policy conceived with this project, of the government's carrying out as part of its utility function great multipurpose river developments on a self-supporting basis, were lost sight of. In its stead, beginning in 1933, a new motive and purpose for such public works projects was exemplified by the "make work" programs which were invoked during that period.

Next came the national flood control policy in 1936 and 1938 under which the United States pays on a non-reimbursable basis the total construction cost of flood control projects and, in some cases, also the costs of lands and rights of way. However, such proj-

* Extracted from presentation before recent Public Power Association conference at Colorado Springs, Colo.

ects must show a benefit-to-cost ratio exceeding unity. This has enabled the War Department to more than compete with the Bureau of Reclamation in using the U. S. taxpayers' money for the benefit of local areas for the reason that irrigation investment must be returned without interest, while flood control expenditures require no return to the U. S. Treasury.

During the depression years, a number of great multiple-purpose water projects were constructed by the United States with provision for large production of hydroelectric power coming more and more to the foreground. In fact, in the case of the Tennessee Valley Authority, power was the prime purpose, although technically included as incidental to river regulation, navigation and flood control.

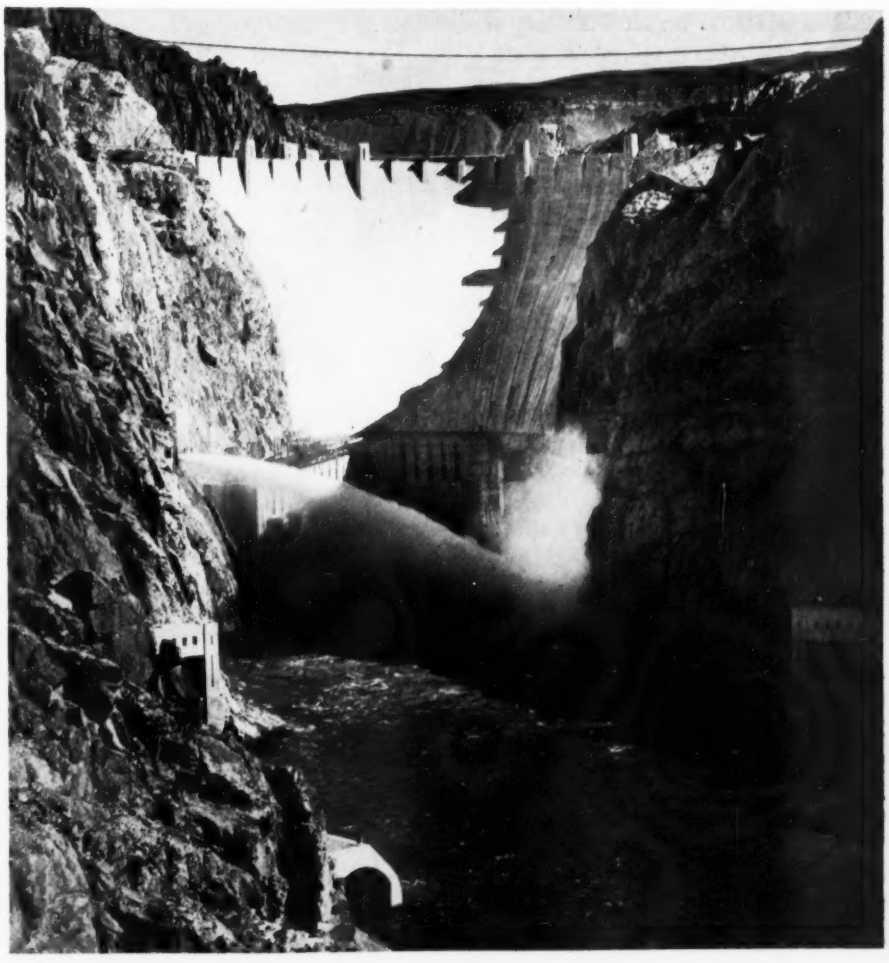
Bonneville Dam and Grand Coulee Dam were constructed on the Columbia River, an interstate and international stream, and the Bonneville Power Administration in the Interior Department was created to transmit and market the power from these War Department and Bureau of Reclamation constructed and operated projects. The Bureau of Reclamation took over the California Central Valley project, planned and authorized by the people of California as a state project. The bureau constructed the Shasta and Friant dams. In Texas the bureau built the Marshall Ford Dam on the Colorado River of Texas. The War Department built the Fort Peck Dam on the upper Missouri River for river regulation and incidental power. In provisions for power on these major projects there was a lack of uniformity in policy which, perhaps inadvertently, gave competitive advantage to some areas over the Boulder Canyon project service area.

Now, in this postwar period of prosperity, I have a feeling that the atmosphere in Washington, the thinking which goes on in the halls of Congress and, in part, even in the administrative departments in Washington, is that appropriations should be cut; multiple-purpose water projects, especially hydroelectric projects, should be delayed; prices are too high, materials and skilled labor are too scarce. There is all too much thinking in terms of ironing out business cycles by delay until there are surpluses of labor and materials and the construction of such works would become again an important factor in improving employment and economic conditions during the next depression. All of this might be true if we had, at the present time, excess power reserves instead of critical power shortages.

Somehow, some way, we must awaken the people to the fact that there is a general shortage of reserve power

Bridge Canyon Dam site on lower Colorado. Proposed self-liquidating projects financed by callable revenue bonds would develop in this area alone power equivalent to burning in steam plants nearly 15,000,000 barrels of oil yearly

Hoover Dam is an outstanding example of the type of economically feasible, self-liquidating project proposed. It was set up to insure repayment with interest of the taxpayers' full investment after equitable allowance for flood control



capacity and, in many cases, a critical power shortage which cannot be alleviated for several years; that it now requires three years to obtain delivery of generating and other equipment.

U. S. Holds Back

While each and all of the publicly and privately owned utilities must proceed to construct adequate power capacity, the United States continues to hold back in its responsibility for immediate appropriations adequate to construct hydroelectric works which will provide needed reserve capacity. Of course, there are many areas of the United States where hydroelectric power is not an important factor, but there are regions where it is the controlling factor, regions within the influence of interstate rivers such as the Colorado and Columbia and the Tennessee Valley, in which the United States has assumed the sole responsibility for developing hydroelectric power.

On these streams, there remains millions of kilowatts of hydroelectric capacity which can be developed at costs lower than steam power and also lower than the smaller hydroelectric plants which local public and privately owned utilities are permitted to construct on minor streams. We who operate these utilities cannot wait for depression years in which to build. We must and are building now, whatever the cost.

On the lower Colorado River at Glen and Bridge Canyon Dam sites there is the opportunity to develop power the equivalent to the burning in steam plants of nearly 15,000,000 barrels of oil per year. On the lower river as a whole, new projects the equivalent of more than 25,000,000 barrels may be developed. During the past year we received word from the Bureau of Reclamation that they were running out of funds to coredrill and test the Glen Canyon Dam site. In the absence of federal funds we contributed to the bureau $60,000 to continue this work. We would like to see all pertinent agencies of the United States recognize the pressing need for these plants on the lower Colorado River. On the Columbia River, it is the same story. The federal plants on the Columbia River in 1946-47 produced 50% of the electric power consumed in the Pacific Northwest, but here again, appropriations are inadequate to provide the power capacity required and only the United States may build the great dams and power plants on the Columbia River. It is noteworthy that both public and privately owned utilities in the Pacific Northwest have joined in presenting their appeal to the United States to generate sufficient power to avert critical shortages. The forecast and request is for 300,000 kw. of additional capacity per year for the next ten years.

New Policy Needed

How should we differentiate in treatment between self-supporting and self-sustaining water and power projects constructed with funds from the federal treasury which will be repaid with interest within prescribed periods of time and other forms of federal projects, the costs of which are generally recognized as being non-reimbursable? I believe the answer is that the government should abandon the policy of holding up the former type of self-sustaining works until periods of depression in order that they might be used as a means of curing such depressions and ironing out the business cycle.

We should go back to the period before the thirties and look again at the policy adopted in 1928 when the Boulder Canyon Project Act was adopted. It will be recalled that this act provided that the Secretary of the Interior must have firm contracts for repayment of all costs with interest in 50 years of the Hoover Dam and power plant with the exception of $25,000,000 allocated to flood control without interest which, under the Boulder Canyon Project Act, need not be returned until after the 50-year period.

The Secretary obtained such firm repayment contracts with both public and privately owned electric power utilities and with The Metropolitan Water District of Southern California. When this had been done, the work was authorized, funds made available, and the works were constructed and have been in successful operation for 12 years.

Why not adopt such a policy as to feasible water power projects susceptible of development by the United States?

Why Not Revenue Bonds?

Perhaps thought should be given to an additional factor of evident protection to the United States taxpayer to distinguish the form of financing of these projects. This might be done by the issuance of United States water power revenue bonds. There is a great deal to be said for issuing such revenue bonds on a callable basis.

This callable feature has a very important advantage in revenue bond financing of utility works as we must, in a utility, build works to meet demands even when costs and interest rates are high. At a later date, under lower interest rate markets, the power utility, either public or private, may refinance by calling high interest rate bonds and issuing low interest rate bonds in their stead, thus enabling the utility to gain the benefit of favorable money markets.

Revenue bonds, as the term is discussed here, mean bonds payable exclusively out of the revenues of a self-liquidating publicly owned utility. They are dealt in exclusively in reliance upon the adequacy of such revenues to meet service charges upon the bonds, in addition to paying the costs of operating and maintaining such utility and all other charges against the revenues. It may surprise some to be informed that at the time the Boulder Canyon Project Adjustment Act was being sought, proposed by the government for issuing United States bonds in the principal amount approximately equal to the aggregate of the advances from the Treasury to the project, the bonds to bear interest at not exceeding 3½% and maturing at such times, not later than 1987, (the expiration of the 50-year power contracts) and in such amounts as would conform, as nearly as could be determined, to the schedule of repayments of such advances by the power users through rates.

I am informed that officials, high enough in the government to control the fate of the Adjustment Act, insisted that this funding plan be made part of the act. Such insistence was subsequently abandoned when it developed that the inclusion of the funding provision in the act would preclude the adoption of it before the 76th Congress adjourned.

Financing Self-liquidating Projects

Senator Cain of Washington is reported to be currently considering the introduction of a bill in Congress to provide for the financing of present and future self-liquidating reclamation projects, as well as such portions of broad multipurpose projects as are determined to be self-liquidating.

Some suggestion has been made for consolidation of all such self-liquidating projects into one revenue bond fund. This would have the effect of stronger projects supporting the weak ones and only requiring that the total of all projects should pay out successfully. In such a proposal some very weak and uneconomic projects may be carried along.

I am presently more impressed by each project standing by itself. If repayment with interest is guaranteed by contracts as was required at Hoover Dam and revenue bonds issued on each such project, it would appear that it would be possible to bring into the picture new elements to judge the economic soundness and worth of new federal water power and domestic

water projects. This new element would be the investing public. The confidence of these investors in sound projects should give confidence to the general public and in the halls of Congress. If this be accomplished, the features inherent in such projects differentiating them from other forms of public work will have been more clearly defined to the point that every one can recognize them and adequate funds should, by reason of their soundness, become available for such self-liquidating projects.

A proposal of power revenue bonds for financing federal hydroelectric projects which have been guaranteed by power contracts should afford a means of securing authorizations and financial approval of Congress. It would make possible construction of needed economically sound water power projects to meet the needs of utility service and to restore the power reserves required to protect peacetime demands with some added reserve for possible wartime production. It should be given serious study and the complex legal, political and financial problems should be attacked without delay. For certain it is that authorizations and appropriations for these self-liquidating water projects are at the present lagging in an altogether unfortunate and critical manner, which may prove of great danger should war come.

Federal agencies, in complete control of the country's great rivers, have mapped large programs but national policy and the Congress have not implemented these programs with necessary authorizations and appropriations. *Generation of vitally needed hydroelectric energy has become involved in political maneuvering, and, in many instances, is threatened with the burden of uneconomic irrigation projects which cannot carry their own costs.*

This is no time for argument of private vs. public power. The needs are so great and so imperative that all persons and parties should pull together to secure the necessary additions to hydroelectric capacity to protect the economy and security of our country.

NORTHWEST KW OUTLOOK

is serious during the next few years as viewed by RALPH A. TUDOR, a colonel in U. S. Army Engineers during the war and now in consulting practice. As engineer in charge of the Portland district for a number of years and War Department member on the Bonneville Power Administration advisory board and having done the preliminary engineering on McNary he speaks with authority on Northwest power outlook

A SERIOUS shortage of electric power is confronting the Pacific Northwest and there is every prospect that this unfortunate situation will continue for the next several years. During the low water stage of the past winter virtually every kilowatt that could be generated and delivered was consumed. There was no surplus. When a main transmission line from Coulee Dam failed for a few days, there was no alternate but to curtail deliveries to industry—in this instance aluminum.

Unfortunately there does not appear to be an early relief from the difficulty and serious adverse effects on the area can be minimized only by close and whole-hearted cooperation between all of the private and public power generating and distributing agencies involved including strenuous efforts to increase generating capacity as rapidly as possible. The Northwest Power Pool, which was formed early in the war when a power shortage was first threatened, has been remarkably effective in this respect. This pool is a voluntary association of all the principal public and private power agencies in Washington, Idaho, northern Oregon, western Montana, and northern Utah. Its effective interchange of power has kept approximately 300,000 kw. of additional energy available by reason of the great diversity in the pool—power that would otherwise have been unavailable. Such cooperation must continue, but in the end only large additional generating and transmitting capacity will alleviate the difficulty.

The conditions which have led up to this situation are interesting. Early in 1938 the federal government completed installation of the first two generators at Bonneville Dam. Three and one-half years later the first Coulee unit was put on the line. Bonneville Power Administration built the heavy-duty transmission lines to deliver the power of these two dams to load centers. These large federal installations were sufficient to meet all foreseeable demands of the area at that time. Furthermore, because they were able to allocate part of the costs for other benefits and were exempt from payment of taxes, they delivered energy at such nominal rates that further generation installation by private industry was effectively curtailed. Had it not been for the heavy industrial expansion made necessary by the war, the full generating capacity of these two dams might not have been required for many years. However, in view of war demands, it was indeed fortunate that the dams were available and more generators could be added in the shortest possible time. Aluminum, ship building, the Hanford plutonium plant and many other war-stimulated industries, with their attendant power consuming services, came to the Northwest. The average power load tripled from 1940 to 1944.

When the end of the war was in sight it again appeared that there might be a surplus of power. From 1944 to 1945 there was a sharp drop of approximately 10%. But by 1946 the trend had again reversed and at the end of 1947 the demand exceeded even the maximum wartime record by almost 20%.

What had happened to create this postwar problem? True, many war industries had disappeared, but so had many continued. Most particularly aluminum was in great demand and plants that had been closed were re-

opened. Today, almost the entire production capacity of all the war-built Northwest aluminum plants is again in full operation. Furthermore, the abnormal population increase of the war has remained and again, contrary to expectation, the growth has continued. This has meant more consumption of electricity in homes, stores, small service industries and for other attendant purposes.

Future Power Demands

Many estimates have been made of what the future demands for energy will be in the Northwest and all of them arrive at the same conclusion. Barring only a major economic recession, the supply will lag for several years. Only by careful operation, extraordinary reliance on interruptable (secondary) power, and the good fortune of more than minimum water can even normal expansion in the area be met for the next few years. Beyond that it is vital that new generation be added.

The authors recently had occasion to make an independent estimate of future power needs for Washington, northern Oregon, and northern Idaho —the western group of the Northwest Power Pool. The purpose was to determine if there is a real need for expediting the construction of McNary Dam. The estimate was deliberately conservative. No unusual national defense loads were anticipated; no expansion of the aluminum load beyond the full requirements of the plants now in the area was included; electrification of railroads, unusual industrial expansion, and new uses such as space heating of homes and buildings were all discounted. Nonetheless it was estimated that the new generating facilities that are assured of being added will barely keep ahead of these conservatively estimated increases in demand through 1950 and that thereafter a definite shortage will exist unless adequate new plant is provided. The picture can be no better than this unless there is considerably more than minimum water for the hydro plants, and it can be materially worse.

Tables I and II list through 1956 for federal, public and private bodies new generating resources that are assured. It is expected that in 1956 the peaking requirements will reach at least 4,760,000 kw. By comparison, the Bonneville Power Administration estimates this at 5,765,000 kw. The BPA may well be nearer the truth if the power could be made available and prosperity continues at even some reduction in the present accelerated pace. In the event of a substantially increased national defense load both estimates are probably low.

Table I

Schedule of Additions to the Power Capabilities of the Western Group of the Northwest Power Pool in Megawatts

(December of Low Water Year)

Year	Month	Plant or Dam	Addition	Average Load Cumulation	Addition	Peak Load Cumulation
1947	Dec.			2,115		2853
1948	Feb.	Coulee	88	2,203	120	2973
	June	Coulee	64	2,267	120	3093
1949	April	Coulee	47	2,314	120	3213
	July	Coulee	14	2,328	120	3333
	Aug.	Coulee	2	2,330	120	3453
		Ross Dam	80	2,410	0	3453
1950	April	Coulee	0	2,410	120	3573
	June	Gorge Plant	20	2,430	40	3613
	July	Coulee	0	2,430	120	3733
	Sept.	Merwin	5	2,435	50	3783
	Oct.	Coulee	0	2,435	120	3903
1951		Hungry Horse	65	2,500	0	3903
1952		Hungry Horse	60	2,560	0	3903
		Ross Dam	80	2,640	80	3903
1953		Hungry Horse	60	2,700	0	3983
		Ross Dam	0	2,700	240	4223
1956		Ross Dam	25	2,725	50	4273

A conservative estimate of peaking requirements for 1960 by the author is not less than 5,600,000 kw. The peaking facilities now available are 3,093,000 kw. and all of the assured additions, not including McNary Dam, will increase this to only 4,273,000 in 1956.

Additional Power Generation

Strenuous efforts are being made to add new generating facilities in the area and much is being accomplished by both private and public members of the Northwest Power Pool. Table I gives the additions which are assured and will directly serve the western group of the pool. Table II completes the over-all picture for the Northwest.

Minimum water is assumed. If average water conditions are realized, approximately 300,000 kw. will be added to the available average resources for the critical period of December and January each year.

Another 100,000 kw. can generally be made available to the western group by the eastern group through an interconnection in northern Idaho.

Beyond these assurances there are

Table II

Generating Capacity Scheduled for Installation By Non-Federal Utilities

1948-1956

Privately Owned Utilities	Plant	Name-plate Rating (Thousands of Kw.)	Year
Idaho Power Co.	Upper Malad	7.5	1948
	Lower Malad	8.5	1948
	Lower Salmon	18.5	1948
	Lower Salmon	34.5	1949
	Bliss	75.0	1949
	Bliss	25.0	1950
Total Idaho Power Co.		169.0	
California Oregon Power Co.	Toketee Falls	28.3	1949
Montana Power Co.	Kerr	56.0	1949
Pacific Power & Light Co.	Merwin	45.0	1950
Total Private Utilities		298.3	
Publicly Owned Distributors			
City of Eugene	Steam Plant	20.0	1949
	Leaburg	7.5	1949
	Waterville	8.0	1950
Total Eugene		35.5	
City of Seattle*	Gorge	60.0	1950
	Ross	180.0	1952
	Ross	180.0	1956
Total Seattle		420.0	
Total Public Agencies		455.5	
Total all installations		753.8	

* Also 900,000 acre-ft. of additional storage at Ross Dam between 1948 and 1951.

several large federal projects that are authorized and on which the Northwest must depend for relief from its power tight position. Chief among these is the McNary Dam across the Columbia River near Umatilla, Ore. It is already under construction and, if pushed aggressively, can deliver power starting in the fall of 1953. This is the first of the big projects that can be completed and all efforts should be directed to that end. One finished project would be much better for everyone than two more partially completed ones. McNary's 838,000-kw. capacity will do much to alleviate the situation.

Foster Creek Dam, on the Columbia and about 50 miles below Coulee, has been authorized and is being designed. It's 576,000 kw. of power will be needed as rapidly as the project can be completed. The earliest possible date that now seems possible for delivery of initial power from Foster Creek is 1954.

Four dams, each with power installations of approximately 240,000 kw., are authorized on the Snake River below Lewiston. They are being designed but the first delivery of power from any of them cannot be earlier than 1953.

Several other large dams on the Columbia and its tributaries have been investigated and at least some of them would be sound economic ventures at this time.

Over a million kilowatts (1,101,000 to be exact) were flowing from Grand Coulee into the Northwest Power Pool when C. F. Knierim, senior operator at Coulee, and S. E. Hutton, information officer on the Basin project, checked April 28

It has been fairly estimated that there is an ultimate economic potential power generating capacity of approximately 25,000,000 kw. on the Columbia River and its tributaries. Only about 2,400,000 kw. of this has already been developed. (Steam power generation and hydro development on streams not tributary to the Columbia add to this total.) Hence there is a large balance that remains available. A word of caution, however, should point out that a fair proportion of this would not be economical today though it probably will be in the future.

Coal

Oregon and Washington both have deposits of coal. However the quality is generally inferior and the quantity not great. This coal has not been used for steam generation nor does it appear that it will ever seriously compete with or even supplement hydro generation. Coal from Montana or more remote sources is not in the picture competitively because of price.

Oil

Oil for steam generation in the Northwest must be imported. Limited quantities are used but utilities have been unable to obtain firm commitments for future deliveries. Increasing prices of fuel oil have made power generated from this source much more expensive than hydro and only a little less expensive than coal. A modern steam plant equivalent in capacity to McNary Dam would consume some 11,000,000 bbl. of oil per year and the cost of fuel alone for such a steam plant would materially exceed all costs of maintenance, operation and amortization of the dam and the main transmission system to load centers. Oil is not competitive.

Hog Fuel

Hog fuel (waste wood) is used to a limited extent for steam generation but the supply is entirely inadequate and no expansions are possible.

Natural Gas

Plans are afoot to bring a supply of natural gas from the Canadian Province of Alberta to Vancouver, B. C. If this is accomplished deliveries will, in all probability, be made to Spokane, Portland, and the Seattle areas. Tentative plans contemplate delivery of about 75 billion cubic feet annually which is approximately sufficient fuel to generate the power planned for McNary Dam. This gas line would be a real boon to the area and, if started promptly, could probably be built before McNary could be completed.

Atomic Energy

The possibility of developing power from atomic energy now seems probable. However the chairman of the Atomic Energy Commission, David E. Lillienthal, has recently advised that this new source of power, when developed for commercial use, should not supplant existing economic sources of energy supply but will more probably supplement them. He has advised that no sound and economical steam or hydro plants should be delayed because somewhere in the future atomic energy will be available as an additional source of power.

The Pacific Northwest has a serious power shortage and the situation will remain critical for several years. Nominal increases in the load can be handled but the rate of increase that has occurred during the past two years cannot be sustained.

If McNary Dam and certain other large projects now planned principally by the federal government are completed in an expeditious and orderly manner and the necessary transmission lines to load centers are included, the present shortage can be corrected and thereafter normal and proper supplies assured. The uncertainty of adequate continuing federal appropriations for these projects obscures the future.

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opened. Today, almost the entire production capacity of all the war-built Northwest aluminum plants is again in full operation. Furthermore, the abnormal population increase of the war has remained and again, contrary to expectation, the growth has continued. This has meant more consumption of electricity in homes, stores, small service industries and for other attendant purposes.

Future Power Demands

Many estimates have been made of what the future demands for energy will be in the Northwest and all of them arrive at the same conclusion. Barring only a major economic recession, the supply will lag for several years. Only by careful operation, extraordinary reliance on interruptable (secondary) power, and the good fortune of more than minimum water can even normal expansion in the area be met for the next few years. Beyond that it is vital that new generation be added.

The authors recently had occasion to make an independent estimate of future power needs for Washington, northern Oregon, and northern Idaho —the western group of the Northwest Power Pool. The purpose was to determine if there is a real need for expediting the construction of McNary Dam. The estimate was deliberately conservative. No unusual national defense loads were anticipated; no expansion of the aluminum load beyond the full requirements of the plants now in the area was included; electrification of railroads, unusual industrial expansion, and new uses such as space heating of homes and buildings were all discounted. Nonetheless it was estimated that the new generating facilities that are assured of being added will barely keep ahead of these conservatively estimated increases in demand through 1950 and that thereafter a definite shortage will exist unless adequate new plant is provided. The picture can be no better than this unless there is considerably more than minimum water for the hydro plants, and it can be materially worse.

Tables I and II list through 1956 for federal, public and private bodies new generating resources that are assured. It is expected that in 1956 the peaking requirements will reach at least 4,760,000 kw. By comparison, the Bonneville Power Administration estimates this at 5,765,000 kw. The BPA may well be nearer the truth if the power could be made available and prosperity continues at even some reduction in the present accelerated pace. In the event of a substantially increased national defense load both estimates are probably low.

Table I

Schedule of Additions to the Power Capabilities of the Western Group of the Northwest Power Pool in Megawatts

(December of Low Water Year)

Year	Month	Plant or Dam	Addition	Average Load Cumulation	Addition	Peak Load Cumulation
1947	Dec.			2,115		2853
1948	Feb.	Coulee	88	2,203	120	2973
	June	Coulee	64	2,267	120	3093
1949	April	Coulee	47	2,314	120	3213
	July	Coulee	14	2,328	120	3333
	Aug.	Coulee	2	2,330	120	3453
		Ross Dam	80	2,410	0	3453
1950	April	Coulee	0	2,410	120	3573
	June	Gorge Plant	20	2,430	40	3613
	July	Coulee	0	2,430	120	3733
	Sept.	Merwin	5	2,435	50	3783
	Oct.	Coulee	0	2,435	120	3903
1951		Hungry Horse	65	2,500	0	3903
1952		Hungry Horse	60	2,560	0	3903
		Ross Dam	80	2,640	80	3903
1953		Hungry Horse	60	2,700	0	3983
		Ross Dam	0	2,700	240	4223
1956		Ross Dam	25	2,725	50	4273

A conservative estimate of peaking requirements for 1960 by the author is not less than 5,600,000 kw. The peaking facilities now available are 3,093,000 kw. and all of the assured additions, not including McNary Dam, will increase this to only 4,273,000 in 1956.

Additional Power Generation

Strenuous efforts are being made to add new generating facilities in the area and much is being accomplished by both private and public members of the Northwest Power Pool. Table I gives the additions which are assured and will directly serve the western group of the pool. Table II completes the over-all picture for the Northwest.

Minimum water is assumed. If average water conditions are realized, approximately 300,000 kw. will be added to the available average resources for the critical period of December and January each year.

Another 100,000 kw. can generally be made available to the western group by the eastern group through an interconnection in northern Idaho.

Beyond these assurances there are

Table II

Generating Capacity Scheduled for Installation By Non-Federal Utilities

1948-1956

Privately Owned Utilities	Plant	Name-plate Rating (Thousands of Kw.)	Year
Idaho Power Co.	Upper Malad	7.5	1948
	Lower Malad	8.5	1948
	Lower Salmon	18.5	1948
	Lower Salmon	34.5	1949
	Bliss	75.0	1949
	Bliss	25.0	1950
Total Idaho Power Co.		169.0	
California Oregon Power Co.	Toketee Falls	28.3	1949
Montana Power Co.	Kerr	56.0	1949
Pacific Power & Light Co.	Merwin	45.0	1950
Total Private Utilities		298.3	
Publicly Owned Distributors			
City of Eugene	Steam Plant	20.0	1949
	Leaburg	7.5	1949
	Waterville	8.0	1950
Total Eugene		35.5	
City of Seattle*	Gorge	60.0	1950
	Ross	180.0	1952
	Ross	180.0	1956
Total Seattle		420.0	
Total Public Agencies		455.5	
Total all installations		753.8	

* Also 900,000 acre-ft. of additional storage at Ross Dam between 1948 and 1951.

several large federal projects that are authorized and on which the Northwest must depend for relief from its power tight position. Chief among these is the McNary Dam across the Columbia River near Umatilla, Ore. It is already under construction and, if pushed aggressively, can deliver power starting in the fall of 1953. This is the first of the big projects that can be completed and all efforts should be directed to that end. One finished project would be much better for everyone than two more partially completed ones. McNary's 838,000-kw. capacity will do much to alleviate the situation.

Foster Creek Dam, on the Columbia and about 50 miles below Coulee, has been authorized and is being designed. It's 576,000 kw. of power will be needed as rapidly as the project can be completed. The earliest possible date that now seems possible for delivery of initial power from Foster Creek is 1954.

Four dams, each with power installations of approximately 240,000 kw., are authorized on the Snake River below Lewiston. They are being designed but the first delivery of power from any of them cannot be earlier than 1953.

Several other large dams on the Columbia and its tributaries have been investigated and at least some of them would be sound economic ventures at this time.

It has been fairly estimated that there is an ultimate economic potential power generating capacity of approximately 25,000,000 kw. on the Columbia River and its tributaries. Only about 2,400,000 kw. of this has already been developed. (Steam power generation and hydro development on streams not tributary to the Columbia add to this total.) Hence there is a large balance that remains available. A word of caution, however, should point out that a fair proportion of this would not be economical today though it probably will be in the future.

Coal

Oregon and Washington both have deposits of coal. However the quality is generally inferior and the quantity not great. This coal has not been used for steam generation nor does it appear that it will ever seriously compete with or even supplement hydro generation. Coal from Montana or more remote sources is not in the picture competitively because of price.

Oil

Oil for steam generation in the Northwest must be imported. Limited quantities are used but utilities have been unable to obtain firm commitments for future deliveries. Increasing prices of fuel oil have made power generated from this source much more expensive than hydro and only a little less expensive than coal. A modern steam plant equivalent in capacity to McNary Dam would consume some 11,000,000 bbl. of oil per year and the cost of fuel alone for such a steam plant would materially exceed all costs of maintenance, operation and amortization of the dam and the main transmission system to load centers. Oil is not competitive.

Hog Fuel

Hog fuel (waste wood) is used to a limited extent for steam generation but the supply is entirely inadequate and no expansions are possible.

Natural Gas

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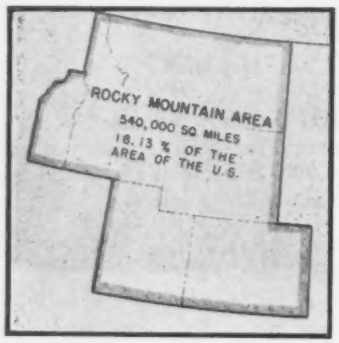
Over a million kilowatts (1,101,000 to be exact) were flowing from Grand Coulee into the Northwest Power Pool when C. F. Knierim, senior operator at Coulee, and S. E. Hutton, information officer on the Basin project, checked April 28

The Northwest now enjoys the benefit of comparatively low electric rates and in fact this has had much to do with the economic well-being of the area. Rapidly rising construction costs and increases in maintenance and operating charges will likely be reflected in increased rates unless every proper economy is effected.

If present rates will not reasonably sustain the federal investment in power, it can be expected that the Congress will insist on increasing the charges. To avoid this, or at least to keep the increases in rates to a minimum, only the most economical hydro projects, including generation and distribution, should be built and a very minimum of facilities that will not economically justify themselves early in their life should be constructed.



WHY REGIMENT POWER

when federal developments can be carried out with large savings to taxpayers by a plan presented to Congress by eighteen business-managed electric utilities of the Rocky Mountain area? In an attractive booklet, they offered several alternate plans for developing and disposing of the power from multi-purpose projects through existing agencies. The companies' presentation is given here almost in its entirety

BECAUSE of the seriousness and importance of the public power program to the electric companies in the Rocky Mountain Area and to every taxpayer and citizen in the United States, eighteen private utilities of that region have reaffirmed their policy and program in a forceful booklet prepared and presented for the information of members of Congress and others who may be interested. ELECTRICAL WEST here presents the context of the booklet almost verbatim and in its entirety.

These companies whose names appear in the accompanying box produce approximately 85% of the electric power generated in the states of Colorado, Utah, Wyoming, Montana, Idaho and eastern Oregon; territory referred to as the Rocky Mountain Area. They serve over 665,000 electric consumers, or approximately 74% of the electric consumers of this area. They represent 58,596 stockholders and have over 8,100 employees.

These companies oppose, as unnecessary, wasteful and leading inevitably toward socialism—the granting of appropriations of government funds for the construction of any electric transmission facilities and of certain generating facilities within the areas they serve.

The evidence is clear that the Department of the Interior, through its agencies, the Bonneville Power Administration and the Bureau of Reclamation, intends to create an electric power system which will completely duplicate the transmission facilities and much of the generating capacity of the existing taxpaying utilities in the Rocky Mountain area. The ultimate aim of the Department of the Interior is the complete socialization of the electric utility industry throughout the area. The Bonneville Power Administration and the Bureau of Reclamation are asking at this time for appropriations for first phases of this program, and it is in opposition to such appropriations requests that the presentation was made.

The privately financed, taxpaying utilities have pioneered the electric power industry and, in the sincere belief that the federal power program—

Is a wasteful expenditure of public funds and will result in continued high taxes;

Places the federal government in direct competition with its taxpayers;

Invades the field of private enterprise;

Is a direct step toward socialization of the utility business and all other industry; and

Is highly discriminatory against private utility companies and their customers whose taxes help make possible such projects;

they have, in their presentation, reaffirmed their policies and set forth a program which will produce the most for reclamation and at the same time save taxpayers' money and stop socialization of vital American industry.

Electric utility companies who sponsored booklet, "Reclamation Without Waste and Regimentation" presented for the information of members of Congress and others interested:

- Arvada Electric Co.
- California-Pacific Utilities Co.
- Cheyenne Light, Fuel & Power Co.
- Colorado Central Power Co.
- Frontier Power Co.
- Home Gas & Electric Co.
- Idaho Power Co.
- Mountain States Power Co.
- Mountain Utilities Corp.
- Public Service Co. of Colorado
- Rangeley Power and Light Co.
- Rawlins Electric Co.
- Southern Colorado Power Co.
- Telluride Power Co.
- Western Colorado Power Co.
- Montana Power Co.
- Uintah Power & Light Co.
- Utah Power & Light Co.

The Public Power Program

The Interior Department program contemplates spending in the Western states in the next six years over $4,400,000,000 of taxpayers' money. The government would build, own and operate dams, power plants, transmission lines and substations to generate and transmit electric power to all load centers.

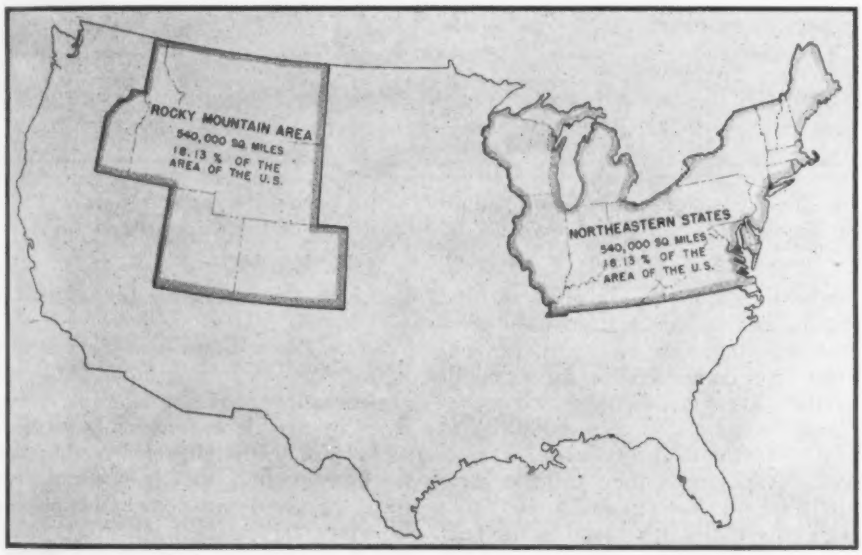
For the Rocky Mountain area alone this public power program includes over $2,000,000,000 for 79 generating plants; over $160,000,000 for 7,235 miles of transmission line and substations; over $2,160,000,000 total

(based on latest published figures. Estimates based on current costs would be in excess of this amount.)

Electric Companies Serve the Area

The entire Rocky Mountain area now is and for over half a century has been adequately served by the electric companies. They have: 1,328,500 kw. of installed generating capacity; 630,000 kw. of generating capacity under construction; 10,890 miles of transmission line; $366,500,000 invested.

Wasteful duplication of facilities is inevitable and eventual liquidation of these taxpaying electric companies will follow as a result of this unnecessary federal power program. The electric facilities of the existing utility companies are shown on the base map on page 94. On page 95 is another map



Rocky Mountain Area here described includes Colorado, Idaho, Montana, Utah, Wyoming and part of eastern Oregon. Total area is nearly one-fifth of U.S.

showing the complete duplication of existing facilities by the federal power program.

These eighteen taxpaying power companies assume continuing responsibility for meeting the future electrical requirements of their service areas. They offer their full cooperation to the United States and the water users' association in developing sound reclamation projects which are so important to the West.

Nationalization of industry leading to totalitarian government through the development of an expensive and unwarranted public power empire, should be stopped by allowing the local producers and distributors of electricity, where feasible:

To build the power houses and generating facilities at reclamation projects, to pay taxes on these facilities, and to pay for the use of the dam and falling water; or

To lease the generating facilities, as at Hoover Dam, at projects where the building of those facilities by the local distributors is not feasible; or

To purchase the electricity at the power house under long-term contracts without discrimination. This third alternative is the least desirable.

All transmission facilities necessary to serve the areas should be built by the distributors without burden on the nation's taxpayers. Savings realized by the utilities under this program will be passed on to the ultimate consumers served, at rates prescribed by regulatory authorities. This program will provide the greatest possible revenue for reclamation projects, will avoid the wastes of enormous sums of taxpayers' money and will increase local, state and federal tax revenues.

Program Presented Will Benefit

The Nation—The program presented by these electric companies, if adopted, will help preserve the traditional American system under which the federal government should not do in a proprietary manner that which private capital is able and ready to do. It will stop the federal government from building up a vast tax-free power system in direct competition with taxpaying citizens who furnish the funds to the government.

The Taxpayers — Hundreds of millions and even billions of dollars of taxpayers' money will be saved in building the proposed projects. Hundreds of millions of dollars of taxpaying property will be added to the tax rolls, thereby easing the burden on all the taxpayers.

The Farmers—Farmers will receive from this program the maximum assistance in carrying out the irrigation developments which are so essential to the West. Maximum net revenues will be assured by long-term contracts with responsible parties. Reclamation by irrigation will again become the chief objective of the Bureau of Reclamation—the prime purpose for which it was created. Much more land can be irrigated with the same expenditure of federal funds.

State and Local Governments—Their tax revenues will increase instead of being decreased or lost altogether. Municipalities which buy their electricity at wholesale will retain their independence instead of having to submit to federal dictation as to their retail rates and the conduct of their business.

Electrical Consumers — The electric power business will continue to be under the regulation of state and local authorities, thus assuring control in the hands of local people thoroughly familiar with local conditions, in contrast to dictatorial, remote, bureaucratic control by an unrestricted federal agency.

Who Is Interested?

Every citizen, every taxpayer, every state, as well as the federal government, should be vitally interested in this bureaucratically controlled electric power program. In these United States, business has been carried on by individuals or by firms or companies composed of many individuals and not by the federal or state governments. This system of private industry or private enterprise creates opportunity, individual initiative, efficiency, economy and freedom and is the system which the entire world concedes has made the United States the most prosperous, most successful nation on earth and the one with the highest and most desirable standard of living. This program of federal power development is an initial step towards changing this situation in America.

How Federal Power System Is Created

Appropriations for portions of the comprehensive plan are sought ostensibly for reclamation, navigation or flood control purposes. Generally the sale of power is represented as a means of payment for part or all of the project. Just a little money is asked for at first. Estimates are relatively modest. But step-by-step the projects are enlarged, additional power features are injected, often in the past without Congressional approval, the cost estimates go up and up, the pieces are tied to-

gether and the result is a comprehensive power system.

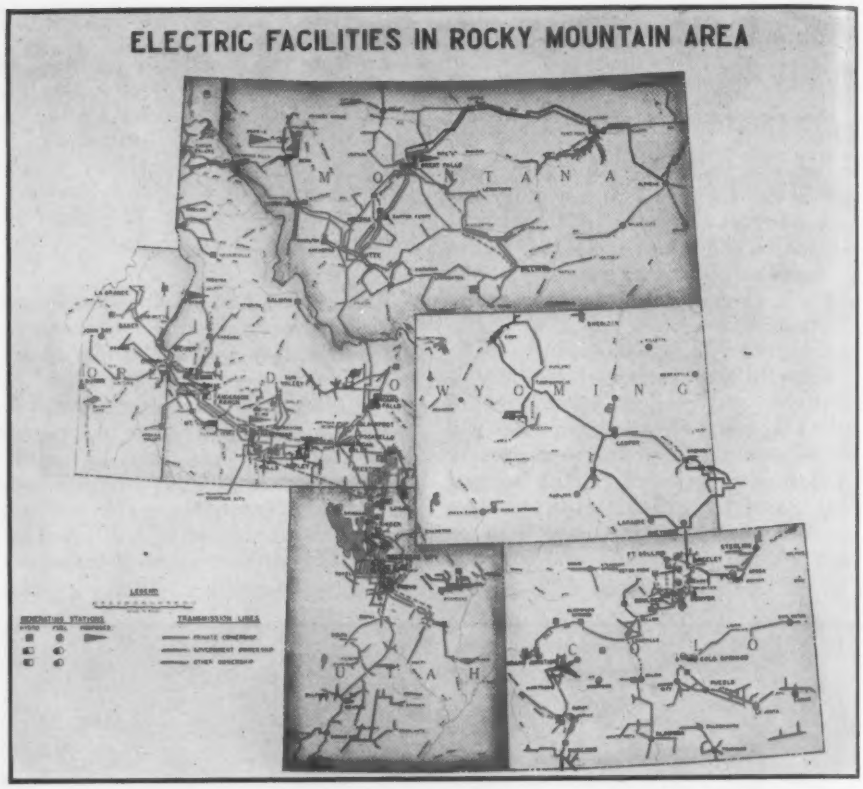
Interpretations of certain "preference" provisions of laws relating to government power have been stretched to their utmost, based on directives issued by the Secretary of the Interior. The outstanding illustration is the Memorandum on Power Policy dated Jan. 3, 1946, which has become the basis of the power policy of the Interior Department. These interpretations of "preference" attempt to justify:

Refusing to sell power to utilities for reasonable periods of time for the alleged reason that it must be retained for future preference customers;

Building a vast network of unnecessary government transmission lines to reach the preference customers;

Aggresively promoting and trying to organize municipal power undertakings and public utility districts to take over existing loads, and thus destroy the taxpaying utilities.

This is the procedure for government ownership and bureaucratic control and operation of the electric industry.



Facilities of eighteen private utilities which generate approximately 85% of the electric energy and serve 665,000 consumers of the Rocky Mountain Area

Over $17,000,000,000 Is Ultimate Cost

The nation-wide program of public power development, according to existing plans, will ultimately cost the taxpayers of this country over $17,000,000,000. This includes joint property, such as dams. The cost inevitably will be much more than this because additional steam plants will have to supplement and firm up hydro plants, and transmission lines not now projected will have to be built.

Plans already announced call for 240,000 kw. of steam generating capacity for the Central Valley Project in California and 375,000 kw. of steam capacity for TVA by 1953. Harvey F. McPhail, director of power utilization for the USBR, recognized this when, at the Washington Program Conference in January 1947, he said:

"I feel the bureau some day will have to go beyond its present scope and get into the use of fuel resources for power generation."

This Interior Department power program will make this one part of the federal government's activities one of the largest businesses of the world. It will be bureaucracy controlled from Washington, D. C. That this federal bureaucracy will completely blanket the area has been shown by the map on page 95.

Of major importance in this over-all plan of the Department of Interior in furtherance of their program is the discriminatory electric tax situation presently existing. Our system of government depends on taxation for its maintenance. Every good citizen and corporation recognizes its responsibilities to pay its proportionate share of such cost. Taxpaying public utilities definitely share their conviction. Note these discriminations against taxpaying utilities, their consumers and security holders:

Special 3⅓% federal tax on electric energy assessed against taxpaying utilities with special exemption for public owned utilities.

Private electric companies pay approximately 20% of their gross revenues in taxes and are forced to compete with tax-free and even subsidized government projects.

Privately owned utilities pay income taxes; government agencies do not.

On money raised for capital purposes owners of securities of private corporations pay income taxes, whereas securities of many publicly owned projects are exempt.

No such heavily taxed private industry can withstand tax-free government competition.

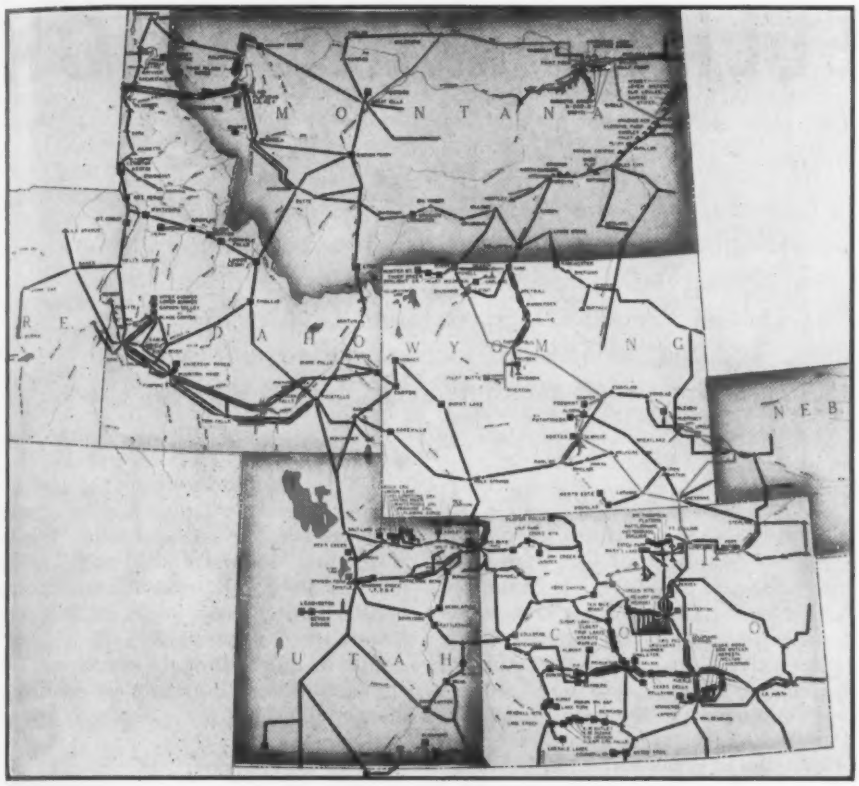
The pressure toward socialization is cumulative, and the further it goes the greater is the tax subsidy and the greater is the tax burden that must be borne by the remaining taxpayers.

Private Power Generation Successful

Generation of power at government dams by private companies is successful. The policy herein reaffirmed by the Rocky Mountain utilities is the American way and was contemplated by Congress in the Federal Power Act, which specifically provides for the issuance by FPC of the license for a power house located at a government dam (Sec. 4 (e)).

Utilities have built power plants at government dams and pay for the use of the dam and the water. At a number of navigation dams, federal power licenses have been given to utilities to build the power plants. Annual payments for the use of the falling water are fixed by the Federal Power Commission. Most important of these are:

Ohio River, above Louisville, Kentucky, Louisville Gas & Electric Co. has a 135,000-hp. plant at a government dam (License No. 362). Kanawha River at St. Paul, the Ford Motor Co. has a 19,200-hp. plant at a government dam (License No. 362). Kanawha River in West Virginia, the Kanawha Valley Power Co. has two plants at a government dam, with total capacity of 42,900 hp. (License No. 1175). Kanawha River in West Virginia, Kanawha Valley Power Co. has a 27,550-hp. plant at a government dam (License



Proposed power program of the Interior Department would practically duplicate existing facilities of the private systems, eventually socialize the industry

No. 1290). Hudson River at Troy, N. Y., Henry Ford & Son have an 8,100-hp. plant at a government dam (License No. 13).

Plants Leased to Utilities

Hoover Dam is an outstanding example of the successful leasing of a power plant at a government dam. Nine municipalities and business-managed utilities lease the power plant under a 50-year contract. Two of them operate the plant. The annual rental completely finances the project (except its flood control features) including payments in lieu of taxes to the states and $500,000 per year to the Colorado River development fund. The lessees own the transmission lines to the dam.

In connection with the Grand Valley project in Colorado, the Public Service Company of Colorado advanced the funds for the construction of the Palisades hydroelectric plant. The company operates the plant under a 25-year lease, paying for the use of the falling water.

Power Should be Sold at Power House

If it is not feasible to have the generating facilities built by or leased to the electric companies, then the way to save taxpayers money and to avoid the many objectional features set forth herein is for the government to sell the power at the power house under long-term contracts to the existing distributors of electricity.

However, in recent years it has not been possible for utility companies to make long-term contracts to purchase power at government dams because it has been, and is, the established policy of the Bureau of Reclamation to build not only the dam, but the power house, generating equipment and all transmission lines necessary to carry the power to the customers or to the load centers.

Cooperation Should Continue

The proven practices of the past should be followed in the future by adopting the utility program advanced herein. The benefits of coordination between the irrigation projects and the utility in marketing the power to be produced at the government dams are greater than ever today. They should be realized and not sacrificed to promote socialization of the electric industry.

Getting Down to Brass Tacks

Federal power bureaucracy is an adventure in applied socialism. *The public ownership of utilities is a foundation stone of all socialistic dogma.*

Under our private enterprise system the government governs and acts as referee. It should not own and operate proprietary business in competition with its citizens.

Saving money for the taxpayers is important.

Taxes are a terrific burden on the American people. Any waste or needless expenditure of tax money is deplorable, especially at this time. The plan of the electric companies to build the power houses and install the generating and transmission systems at government dams would:

1. Save the taxpayers the cost of the power plants and transmission facilities which the government would build according to the present Interior Department program.
2. Place on the tax rolls properties which will pay in taxes each year approximately 5% of the cost of those properties. Utilities pay each year approximately 20% of their gross revenues in taxes. These taxes equal approximately 5% of the cost of the property of these taxpaying companies.
3. Pay to the local, state and federal governments in taxes in 20 years the cost of building the generating and transmission facilities which the electric companies build.

These savings are important and necessary.

Wasteful Duplication

On the contrary, the plan for a federal power monopoly would mean construction, at tremendous cost to the taxpayers, of electric facilities which would duplicate existing power systems and ultimately put a large segment of taxpaying American industry out of business.

Reclamation Will Benefit

The primary purpose of reclamation projects should be to aid the farmers without unnecessary spending of taxpayers' money. The Rocky Mountain Electric companies' plan of cooperation, as set forth, will produce from the power possibilities of each project the maximum amount of money which can be obtained to benefit the reclamation features.

The Basic Question

It all simmers down to one simple question of principle. Shall an agency of the United States Government be permitted to take on activities entirely foreign to the purpose for which it was created, and by so doing enter into wasteful and confiscatory competition with a private enterprise, which is serving the public well and at reasonable rates?

In short, shall we, or shall we not, have socialized industry in the U.S.A.?

SELLING TRANSITION

from aggressive direct merchandising to backing up dealer sales effort with assistance and training, a ten-year program, is culminating successfully for British Columbia Electric Railway Co., Ltd., in Vancouver and Victoria. It has simplified operations, reduced selling cost, increased load and built the industry into a strong selling team to face the future

WHO should sell appliances — utility or dealers? It used to be a strongly controversial subject. Great argument ensued at conventions and dealer meetings over it. Only an echo of the controversy is heard nowadays, for in the West very few utilities still sell appliances. Each came upon the decision to retire in different ways and for a variety of reasons. Each handled the transition according to its own situation. Each is carrying on a slightly different type of promotional work to assist dealers to become the sales agencies for the industry.

Perhaps the smoothest transition from aggressive direct merchandising to complete dealer cooperation was made just across the border of Canada, by British Columbia Electric Railway Co., of Vancouver and Victoria. What it did and how it did it bears looking into for the ideas it contains, the methods employed and the results obtained, no matter what an American utility may be doing or planning to do. It is worth a summary and review here in this Convention-In-Print, even though separate details of it have been told as they occurred in previous issues.

Viewed as a whole the operation was a ten-year program, visualized by W. C. Mainwaring, then merchandise manager, but carried on consistently since, despite the unforeseeable difficulties injected by the war (and Canada was in the war from the very beginning, it must be recalled.) Timing, anticipation of events, preparation ahead for them, has been the characteristic of the program. But timing was possible because of close study of the market conditions, and close association with the dealers and contractors. Results are to be seen in industry-wide harmony and earnest sales effort by these trade allies. If only there were enough electrical energy and a full supply of utilization devices and appliances the results could also be measured much more conclusively in unit sales. However, even so, the totals are impressive.

Such a new lease of life, of revived enterprise and initiative has come into B. C. Electric since its new and young president, A. E. Grauer, entered the conservative old company that much of the change may be attributed to his new leadership. It certainly made continuation of the policy possible, but in justice, the plan was initiated by W. C. Mainwaring. He had originally joined the company after being a wholesaler and a salesman. Now, recently made vice-president in charge of the company's Vancouver Island operations at Victoria, he is bringing the program into being there as well.

Prior to 1934, the sales or commercial department was in four parts with little affinity between them. There was the light and power sales department, the electrical merchandise department, the gas new business department with a separate sales section. Mainwaring, in 1934 created a merchandising department which combined gas and electric appliance sales. In 1936 the gas new business department was eliminated and there emerged a general sales department and a merchandising department. It was in that same year that the company started to withdraw from direct merchandising.

A man was put on dealer liaison under a long-range plan to increase dealer assistance and lessen direct company selling. And in 1938 a definite declaration of this policy was made. In substance it was that as the company saw that dealers could take over successfully the sales it would withdraw from direct sales itself.

When the policy was announced it was thought that it would spread over a ten-year period. Had it not been for the war, into which Canada entered in 1939, the process might have been consumated sooner. First the company quit selling radios, which had fine acceptance, then washers and ironers, then portable lamps, then small appliances, and finally major appliances.

Its showroom on Granville St. was closed in 1946, and that in each branch office as well. The announcement was made then of complete withdrawal from merchandising.

But to quit selling is one thing. To advance its load building by so doing is something else. This is where timing comes in.

First, a brief sketch of present sales department organization: Howard N. Walters is general sales manager and has supervision over all customer dealings both for electricity and gas. Under him are three divisions. There is the sales department, headed by C. A. Manson, sales manager, which handles all commercial and industrial accounts, all extensions and rate intrepretation. Then there are the branch offices in New Westminster and the Frazer valley, each with a branch manager. It is within the customers' services department, the third division, headed by John H. Taylor, that the dealer coordination program is directed. The Vancouver Island Division at Victoria is similarly organized, with Archie W. J. Smith, manager of customer services, and M. C. Trueman, sales manager.

The customer services department has five branches of activity: (1) dealer development, with Bill Bitcon, supervisor; (2) agricultural development, with Ralph Gram, supervisor; (3) liaison services, with R. Hall, supervisor; (4) residential services, with R. W. Bishop, supervisor, and (5) application services, with J. D. McLean, supervisor. Home service, directed by Miss Jean Mutch, reports to Residential Services Supervisor Bishop.

It is to this customer services department that is entrusted the job of both organizing and stimulating the dealers, contractors, inspectors and allied trades to sell and to serve the public, as well as to take care of the direct company service to the public, on farms and in homes.

This grouping of company functions is unusual but very logical. Most utili-

ties place the customer service contacts and applications under the accounting department. Yet this coordination of the agencies that serve the residential and farm public (the dealers, contractors, plumbers, etc.) with the personnel in the company who make direct contact with the customers for the company is thoroughly sound. Certainly it injects a sales attitude, a desire to please, into the applications and treatment of customer relations. And significantly the residential services branch has absorbed and is making excellent use of the former large domestic merchandising sales force.

With this outline of organization form it is pertinent to explore into the functions and responsibilities, as well as the results obtained by these five branches of activity.

On the industry development side are the dealer development, liaison service and agricultural development. On the customer contact side are residential services and application services.

Purpose of the dealer development work is: (1) to promote the sale of electrical appliances through dealers; (2) render advisory service to dealers on appliance repairs; (3) advise dealers on business organization, salesmanship, staff training, etc.; (4) advise dealers on store layout and window displays; (5) develop sales and promotional plans for dealers; (6) check and authorize payment of advertising allowances for dealers; (7) coordinate with the retail merchants associations.

Even such a brief summary of functions reveals some unusual services to dealers, such as appliance service helps, window display help, advertising allowances. More of these will be told later.

The liaison services are to coordinate the utility's relations with other trade groups. It is set up to: (1) promote the adequate wiring program; (2) improve wiring specifications and practices; (3) develop standard plumbing and piping practices and specifications; (4) coordinate company activities with the Electric Service League of B. C.

Under the latter, for which R. Hall, the liaison services supervisor, acts as secretary-manager, comes company cooperation with the Vancouver Electrical Assn., the electrical contractors association in Vancouver; the inspectors association, the association of plumbers and gas fitters; educational work with the unions; with building inspectors, etc. This branch of activity does not enter into selling—the dealer development group works with dealers and plumbers on that—but on codes and installation methods and such matters.

Agricultural development work is directed toward: (1) promotion of the use of electrical equipment on farms; (2) provision of advisory service on simple electrical problems; (3) cooperation with the dealer development department in promoting farm equipment sales by dealers; (4) developing better public relations; (5) preparing articles for publication in newspapers and farm papers; (6) collaboration with other bodies in the conduct of experiments to improve farm methods. The company publishes a little monthly pamphlet to farm customers called "Farm Service News" and this division aids in getting material for it. As the farm customers are served from the branch offices of the company, each branch has a farm advisor attached to it. For administrative purposes he reports to the branch manager but supervision of his work comes under the agricultural development division.

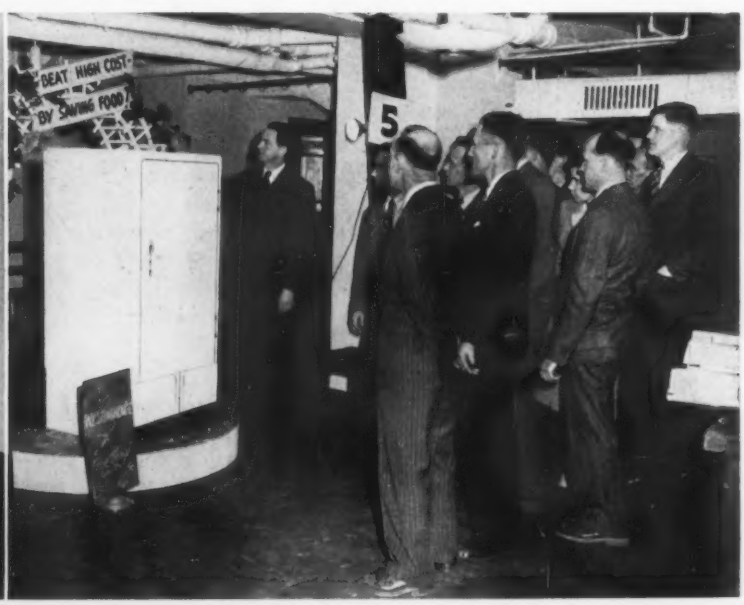
In order to keep separate the trade relations aspects from the customer services the latter will be described later, but it must be said that they supplement each other closely.

Dealer development, to expand the detail about it, encompasses what most utility companies do along similar lines with these important additions: advisory service on window and store display by an expert display man, Jack Butler, and appliance repair helps by Phil Donald, repair consultant.

In addition to a monthly display suggestion sheet sent out with "The Tie-In," a mimeographed bulletin to dealers, Butler has been conducting evening display classes for dealers and their employees whose job it is to arrange displays. These classes are limited to 15 each and meet once a week for three weeks on the same night. Two courses are run simultaneously. The "students" work with actual display materials such as colored corrugated board, prepared lettered cards, platforms, dummy appliances and boxes.

Butler starts each lesson with a short talk at the blackboard dealing with some fundamentals of design and display. Then the class is broken into five groups of three each. Each group is given a space in which to set up a

After a short lecture on display fundamentals, the dealer display people go to work in groups of three, making up dummy window displays (at left), then Jack Butler, B. C. Electric display supervisor, takes entire class to each display (right) and gives a constructive criticism of it. Class closes with a short summary of the night's work and display ideas



display and goes to work. At the end of an hour Butler takes the class around to each and judges and criticizes it, making suggestions for improvement. A short summary at the blackboard ends the session. These classes are very enthusiastically attended and the dealers pitch into the display materials with vim.

"Have a service problem?" the Tie-in asks. "It so, perhaps you will find two heads are better than one," and it tells that often Phil Donald goes out to a customer's home with a dealer's serviceman to assist in finding an answer to a service difficulty. In addition dealers are given assistance on shop layout, methods of keeping service records and similar aids to running a successful repair service department or business.

These two extra services supplement the sales and business training classes, the salesmen's cooking schools, advertising allowances and statistical reports of sales and market opportunities furnished. Advertising allowances are made on dealer sales of major appliances. To receive the allowance the dealer makes a monthly report of his appliance sales. If turned in before the tenth of the month the allowance is paid him that same month. From these sales reports also a summary for the month is made in comparison with the same month a year before, against which the dealer can gage his own proportion of sales.

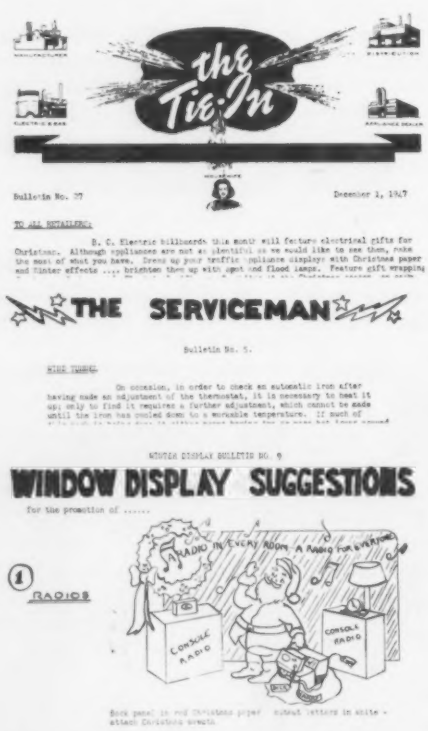
Until more merchandise is available, and in this respect Canada is worse off than the U. S. A. because of import restrictions, not much will be done to stage appliance campaigns among dealers. The single exception has been a constant effort on automatic water heating, both electric and gas. This effort was spearheaded by the publication last year of a fine sales aid pamphlet which dealers are using effectively. It is interesting to note in monthly reports of sales that electric water heaters as well as ranges exceed gas range and water heater sales.

What happened to the residential appliance sales force the company once had? They became district representatives. How did they change from an aggressive selling point of view to one of customer service?

Coincident with much of this reorganization of company responsibilities the management engaged a psychologist for its personnel department to assist and guide in job evaluation, placement and employee relations. All employees were tested and these appliance salesmen among them. Those whose personalities were such that they could be happy only in direct selling with its tangible rewards and measurements of achievement, were advised to remain in selling by seeking sales jobs with dealers. Although it was a sharp adjustment to make at first the demand for their experience and training resulted in jobs at which they are well paid and satisfied.

A large number of the steady experienced salesmen, however, showed aptitudes for a service type of work. At present R. W. Bishop has a staff of 21 district representatives on customer service, including J. O. Bayley, assistant supervisor, all of whom were former appliance salesmen. Each has a specific territory in which he is the company as far as the residential and small commercial customers are concerned.

To prepare them for their new responsibilities Bishop arranged a conference series in which management would outline to them the complete background of company operations. When the program was outlined the personnel and entire general sales division decided to attend also. It ran for nine Mondays and Wednesdays between Oct. 6 and Dec. 3, 1947, from 8:15 to 9:30 a.m. Covered by vice-presidents, chief engineers, superintendents, financial officers and department heads, the series gave information on the company's engineering plans and developments, transportation system, gas system, coke policy, rate theory, electric and gas rates and billing, financial affairs of the company, its relations with the B. C. Power Commission, machine billing explanation, industrial development program, the public utility commission, and ended in a panel symposium to answer all questions developed during the course. It was so successful that it will be repeated for other employee groups later this year.



With each copy of "The Tie-In," a news bulletin to all dealers each month, go both a copy of "The Serviceman," with practical shop and field method hints for simplifying or improving appliance service work, and a copy of "Window Display Suggestions," timed to the season and the sales promotions

In fact the entire district representative staff holds an educational meeting each Friday morning at the same hours. Sometimes it takes the form of a visit to a department, a plant or substation or shop to see how it operates. The idea is to make these district representatives so familiar with every phase of company operation that they can answer nearly all customer questions or find the answers for them. The department heads have never refused to assist in instructing these company representatives.

What these men do in their districts is this: they take applications for service, either by phone or call on the applicant, check high bill complaints, follow alterations in buildings to check service facilities, check loads on commercial accounts, arrange gas main extensions, contact or communicate with newcomers to the city and inform them of the various services available to them in kitchen planning, laundry planning, home service. They handle electric services on a strict priority basis to maintain absolute fairness. They act as liaison between the specialists at the headquarters and the public on such things as home service, lighting, wiring, kitchen planning. They are asked to keep their eyes open and to report any damage to poles or lines.

And having adequate knowledge of company plans they can help inform the public and forestall complaints. A case in point is that the street car system will be considerably upset this year because of street paving, route changing and change of equipment. The superintendent of the car system has told the representatives why and when, and they will be able to explain and interpret it to the public.

Telephone calls for service will also be coordinated by this division in the near future to eliminate annoyances to the caller.

Home service is also under this division. Miss Jean Mutch has been given an attractive and homey office and kitchen on the main floor of the present building. A home service center is also located on the main floor where customers come in. She has a staff of five home service girls and an additional one in the Frazer Valley. Home service gives customers recipe and cooking advice, conducts cooking schools, trains dealer salesmen how to

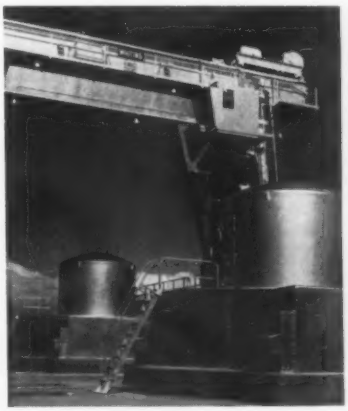
cook in small groups, plans kitchens and laundries.

A typical monthly report shows these girls holding a dozen or so group meetings at which from 20 to 150 attend, making store demonstrations in dealer stores, assisting at distributor promotional meetings, and making customer contacts upon request.

In order to keep such a multiplicity of activities under control and avoid complete confusion a very accurate system of reports and records is kept by a staff of four people. Thousands of slips a month are each entered on ledgers, followed through until satisfactory disposition is made. Records show an average of 9.5 calls per day each per district representative. This means 9.5 calls in which a satisfactory conclusion is reached. In April there were 4,477 contacts or calls or items reported.

As to results, the company is well satisfied. Despite conditions such as shortages of appliances, heavy import restrictions, high costs, the company is said to be thoroughly satisfied that the cost incurred in this combination dealer and customer development program is lower than under the old system. The company has acquired more load at less cost than if it had continued to merchandise. It has promoted industry harmony such as not found in many places. The entire industry has a team spirit that makes it capable of tackling anything. The company is also maintaining intimate relationship with the public on an even more friendly basis than when it relied on selling appliances for customer contact.

TECHNOLOGICAL TRENDS



still offer a promising future to the younger engineer, say J. P. JOLLYMAN, consulting electrical engineer, and J. A. KOONTZ, chief of hydroelectric and transmission engineering Pacific Gas and Electric Co., as they review problems of the power engineer and discuss present practice and technological trends. Building things faster and cheaper under present high costs is the engineer's chief problem, they say

POWER system engineering seems to have lost some of its romance and glamor, if judged by the number of university students who are going into the field of electronics. This is unfortunate, too, because industry cannot possibly absorb the great numbers who are specializing in this war-accentuated field. On the other hand, there is great need for young engineers in the power field. Sixty-cycle problems have not all been solved by any manner or means—nor will they ever be in such a rapidly expanding industry.

Never has the power engineer had so many problems confronting him—fascinating and absorbing, too. Also he has never had as many technological tools with which to work. Manufacturers have kept pace with the growth and requirements of the power industry and the operating engineer has a large variety of reliable apparatus to apply to his problems today. Occasionally, however, the engineer must take stock of his problems and note some current practices and trends, the better to plan his systems for the future.

If there be those who think the power engineer does not have problems, let him step in his shoes. Management is constantly urging him to build faster and cheaper. A lot is involved in those two words, *faster* and *cheaper*. Material shortages and long deliveries confront him on the one hand and high prices for both materials and labor on the other. The harassed engineer cannot do anything about any of them directly. He must find a way out through new designs—new technology, and ways of making labor more productive through modernization. In this latter field, great strides are being made, but that subject is not a part of this particular discussion.

Another way of putting the engineer's chief problem is to say that he must find means of reducing unit costs, or at least holding the line, in the face of rising costs and a rapid and unprecedented growth in load calling for tremendous system expansion. Let us see how he is attacking his problems by a step-by-step review of practices and trends in the various categories of utility engineering.

Generation

Hydro

Here the trend has been toward larger prime movers and generators to cut unit costs. In the large federal projects sizes have ranged in the region of 100,000 kw., the largest being the Grand Coulee machines with a nominal rating of 108,000 kw., but which are being operated at 125,000 kw. Private utilities in their necessarily smaller developments use machines only about half the size of these public power units mentioned.

Hydraulic prime movers have seen small but important increases in efficiency; mitigation of the erosion, corrosion and cavitation problems by the use of stainless steel; and highly refined governing mechanisms. Stainless steel and other special metals have brought changes in practice both in the low head units with the adjusting vane Kaplan turbine and the use of the Francis, or reaction type, turbine for heads at one time considered impractical. By use of stainless steel, manufacturers do not hesitate to offer reaction units for heads in excess of 1,000 ft. at efficiencies over 90%. Such units can be at least three times the size of the largest impulse wheel units suitable for use at these heads.

A notable trend in hydro practice is modernization of some of the older plants using larger modern units to increase capacity and efficiency. Pacific Gas and Electric Co. has one such job under way now where seven original units totaling 20,250 hp. are being replaced by a single 35,000-hp. Francis turbine. Additional water with

a somewhat higher head combine with a gain of 4% to 5% in efficiency to increase energy output by 50%.

Another trend has been in making the smaller hydro plants automatic to reduce operating costs. Some of these are of the outdoor type to save building costs, notably several plants now being built by the Idaho Power Co.

In the electrical end of hydro plants isolated-phase bus is coming into wide use for generator leads. Amplidyne, Rototrol or similar generator field control is just coming into vogue and may become standard practice. Excitation practice is being carefully scrutinized to avoid some of the serious entire plant outages of the past few years.

Steam

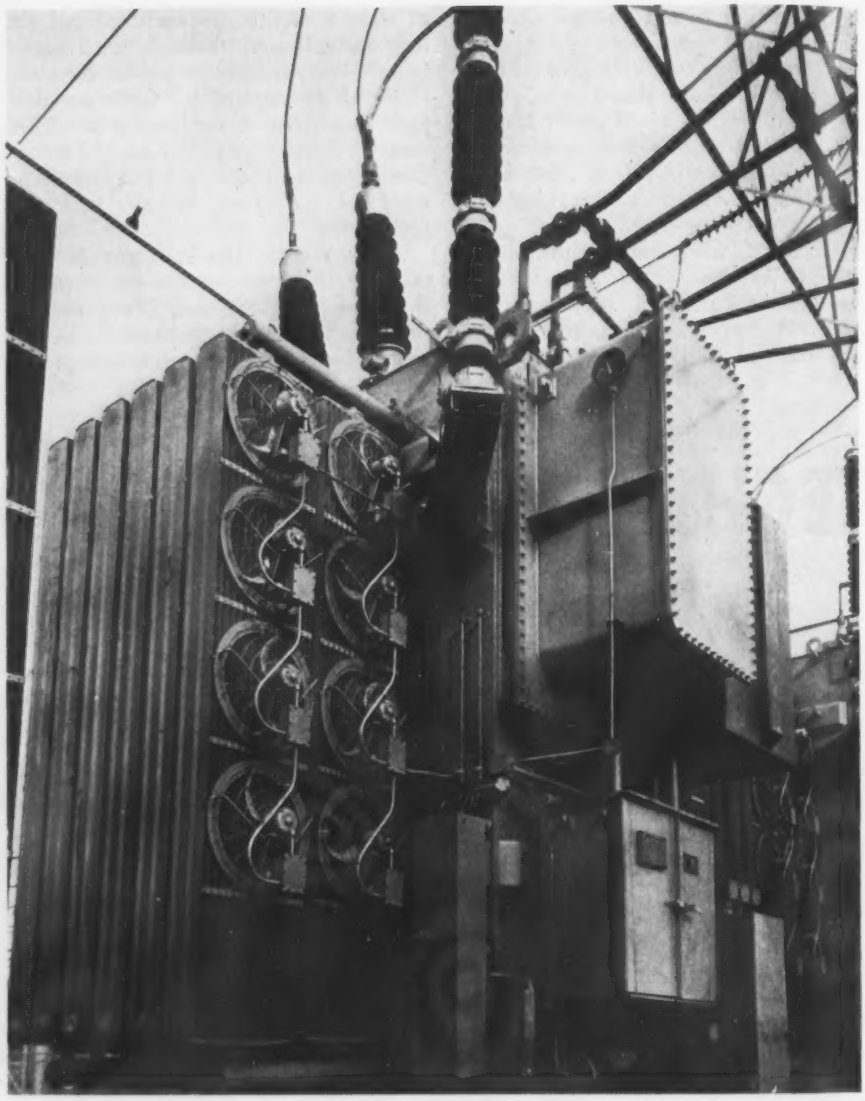
Adoption of the AIEE-ASME standards for steam unit sizes, temperatures and pressures has been a significant development in the field of steam generation. These standards were promulgated to reduce costs and speed deliveries. Most rapid development in steam units has been in the 3,600 r.p.m. class in which 100,000-kw. units are available. For pressures from 800 to 1,400 psi in the single casing machines and with temperatures as high as 1,000° F., these units are provided with or without reheat cycles as economy dictates.

The steam generator, or boiler, has kept pace with the steam turbine, and the manufacturer will provide a single unit capable of operating a 100,000-kw. steam turbine with its auxiliaries at pressures of 1,500 psi at 1,000° F. Studies and research in alloys, coupled with the development of welding and X-ray testing, have made these modern developments possible both in the steam generators and the steam turbines.

Transmission

Growth of load and improvements in equipment are making possible the use of higher voltages for several purposes. The need for transmitting water power from the Sierra Nevadas to the coastal regions of California led to the pioneer 60-kv. transmissions in 1901, and these were followed by the 110-kv. lines in 1908; the 150-kv. lines in 1913 and the 220-kv. lines in 1923. To transmit power from Hoover Dam, both 230-kv. and 287-kv. are being used. The latter is the highest voltage in commercial use in America. The United States and Canada have given wide acceptance to 230-kv. lines.

Presently there is world-wide interest in transmission at much higher voltages. Sweden and France have lines under construction in the 400-kv. class. In this country voltages most discussed are 345 and 450 kv. Tests are underway in the east to study problems at these higher voltages. There appear, however, no technical obstacles that cannot be overcome. In fact, manufacturers have stated that present insulation levels and apparatus for 287 kv. can be used practically without change for 345 kv.



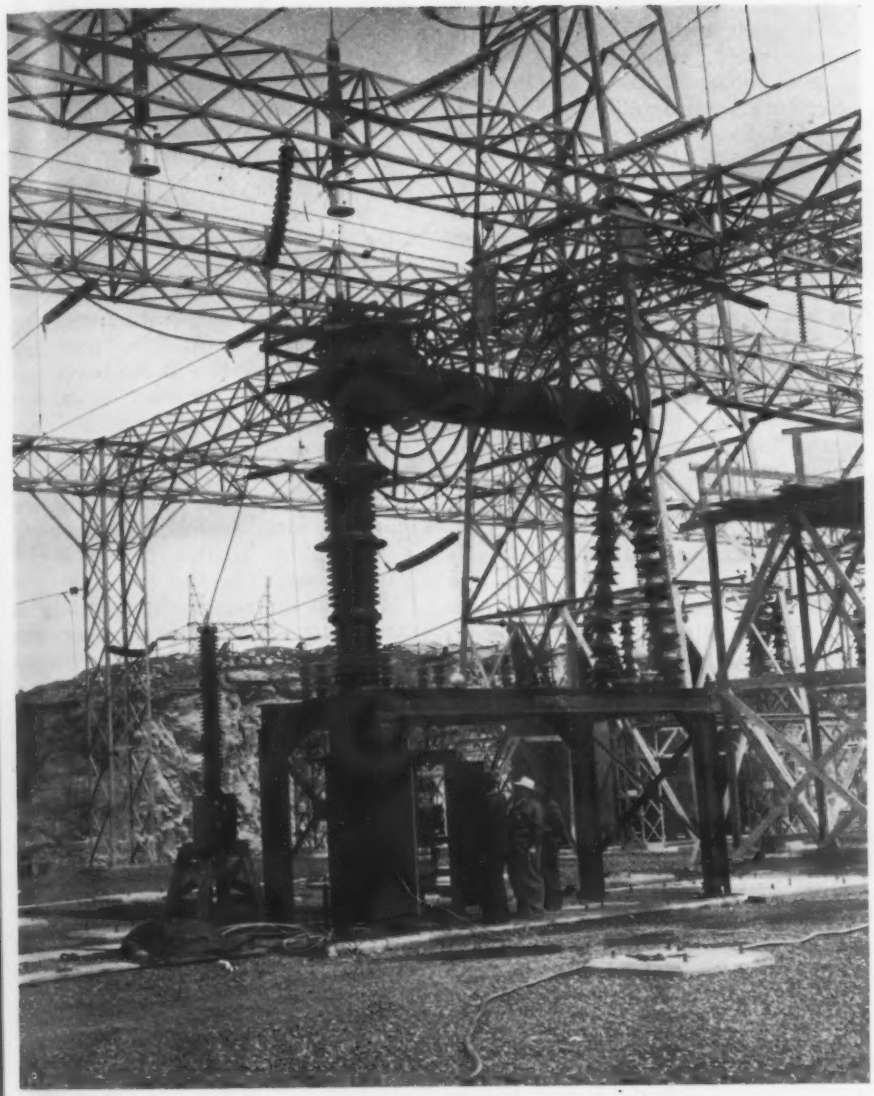
Largest bank of single-phase, multi-rated transformers built by Westinghouse is this installation rated 150/200/250 mva. Units are constructed to be shipped on their sides completely assembled except for bushings, radiators

Series compensation to reduce line reactance has been proposed for lines of 400 miles or more in length. The Los Angeles Department of Water & Power has designed its new Owens Gorge lines for series compensation tests. The Bonneville Power Administration has made very complete studies of series compensation and hopes to build such a line. However, current thinking is in terms of multiple conductors. Lines are now being consid-

Characteristics of 100-Mile Transmission Circuit

for single conductor with conductor whose diameter is proportional to voltage

Kv.	Amp.	MW P.F.=1.0	Conductor M.C.M.	% Loss	Relative Cost Per Mile	Relative Cost Per Kw.	Charging Kva.
60	100	10	133	13.0	100%	100%	1,800
115	200	40	250	6.5	200%	50%	6,500
230	400	160	500	3.25	400%	25%	26,000
325	560	320	700	2.3	...	...	52,000
400	700	480	875	1.87	...	...	80,000
460	800	640	1,000	1.6	...	...	104,000



Rated at 10,000,000 kva. will be six three-phase, 230-kva. G-E impulse breakers to be installed at Grand Coulee next year. Successful operation of this single pole at a duty of 8,800,000 kva. and laboratory tests confirm the rating

ered for use of multiple conductors, each of 500,000 cir. mil copper equivalent capacity. These lines would operate at either 345 kv. or 460 kv. Auto transformers at each end and as an integral part of the line would permit use of present standardized 230-kv. terminal equipment.

A consideration of the characteristics of high-voltage transmission lines, as shown in the accompanying table, indicates some of the problems to be solved when higher voltages than those in use are attempted.

Substations design must be flexible to keep pace with the increasing demand for power. Designs must be capable of development from that of a small unit to serve initial needs of an area to that of a large metropolitan station. Standards have been developed and parts are available which can be added together so that a small simple station may later be developed to meet large metropolitan requirements. These standards include 60-, 110-, and 220-kv. double-selector bus sections suitable for connection with transformers or lines which may radiate from either side of the station.

Switch tower units with disconnecting, grounding, bypass switches and oil circuit breakers up to highest interrupting capacity have been developed. If reasonable foresight and planning is used and ample initial space is provided, it is now possible to utilize these units and extend these stations from a simple start to large stations with two or more bus sections.

A very definite trend is noted to step directly from the higher transmission voltages, even 230-kv., down to primary distribution and to the voltages required for large loads. This philosophy considers that 230-kv. lines can be tapped for loads as small as 5,000 to 10,000 kva. It is the same trend that years ago relegated the very early 60-kv. super-transmission lines down into the category of distribution.

In distribution substations recent trend is strongly toward the unit type. Some utilities have standardized on 1,500- and 3,000-kva. unit stations for stepping down to 4-kv. primary distribution and are buying them in large numbers.

A noteworthy trend in the field of large power transformers is industry acceptance of the war-born triple-rated transformer. These are given a self-cooled base rating; a second rating with fans, and a third with both forced-air and forced-oil cooling. One large manufacturer furnishes these transformers in form-fit cases so that large units can be shipped on their sides, completely assembled except for bushings and radiators. One such bank of transformers, the largest ever built, rated 150,000/200,000/250,000 kva. at 230,000 volts, was recently installed in the Seattle area. A number of smaller banks of the same type have recently been installed in California, also.

For many years switch manufacturers were unable to meet industry requirements for switchgear with adequate interrupting capacity and speed of operation. Today, with the modern arc-quenching devices the manufacturers have greater assurance of being able to produce a 10-million-kva. breaker in the 230-kv. class than of a two-million breaker 10 years ago. It is noteworthy that both General Electric and Westinghouse have tested 10-million-kva. 3-cycle breakers at Grand Coulee and each will soon have such a breaker in service at that plant.

Stability problems have also pointed out the necessity of high-speed operation, both in opening and closing. This the manufacturer is now able to meet, and they offer a 3-cycle breaker in the 230-kv. class which will interrupt in less than 3 cycles and reclose to the order of 20 cycles. Such equipment has materially improved stability of operation and lessened the damage to equipment when faults occur. High-speed single-pole reclosing to improve stability under fault conditions is rapidly coming into favor and some large systems plan such operation.

More and more interest is being evidenced in air-blast circuit breakers for the higher voltages. The 220-kv. German air breaker tested a year ago by Bonneville is being installed at Spokane for observation under regular operating conditions. Air breakers in the 12-kv. class are now quite common and are available also for voltages up to 34-kv.

A new and very significant development in the field of disconnecting

switches is recent tests on three preliminary models of 110-kv. load interrupter disconnects. All interrupted 500,000 kva. successfully and orders have been placed by the utility for one of each. Need for such a switch to eliminate high-cost oil circuit breakers for small loads and substations, perhaps up to 10,000 kva., has long been apparent. This development holds forth great promise.

Distribution

Higher primary voltage is the order of the day in the distribution field. Primary distribution at 11 kv. has been in use in the San Francisco area since 1907, but it is only in the past few years that the industry generally has taken it up. Now, even before some utilities' primaries have been cut over to 4 kv. there has been ushered in 12-kv. distribution for urban areas (such voltages long have been used on rural lines).

Aerial cable for tree areas is a comparatively recent development. The self-protected type of distribution transformer is rapidly gaining in favor. Inhibited transformer oils claimed to have three to five times the life of conventional oils are a new development.

Progress in underground cables for higher voltages has almost kept pace with that of overhead lines. Cables are in operation at 220 kv. in France. The first cables successfully used above 69 kv. were the single-conductor, oil-filled, lead-sheath type. Such cables have been very successful electrically, but the low strength of the lead sheaths limited the oil pressure to small values which required rather elaborate devices to limit oil pressure and keep the cables filled under all conditions of loading. Distances between devices may be as short as 400 ft. on grades.

More recently the pipe types of cables with three single conductors enclosed in a steel pipe filled with oil or nitrogen under about 200-lb. pressure, have been developed and are in use. The devices for maintaining pressure are located at the terminals. Pipe-type cable with gas pressure has been chosen for the 115-kv. cables being installed in San Francisco to interconnect Station P steam plant, Mission substation and Martin substation. The conductors are 1,000,000 cir. mil; each cable having a carrying capacity of 100,000 kw. at 100% load factor. By comparison the cables first used in San Francisco were 4/0, three-conductor impregnated-paper-insulated, 12-kv., capacity of about 4,000 kva.

Other Developments

Some current practices and trends of a more general nature are to be noted. Supervisory and automatic control of substations is very much in the limelight. Southern California Edison has a system-wide supervisory control program; Pacific Gas & Electric Co., a system-wide program for applying automatic control to all but its major substations. Installation on both systems is far advanced toward completion. Stations as large as 50,000 kva. are included.

System planning to take care of load growth is taking the direction of high-voltage ring buses surrounding the metropolitan area of large cities. Into this ring there are several sources of feed, both steam and hydro. On the ring are located substations stepping down to 13.2 or 34 kv. Feeders at these voltages grid the inner part of the circle to feed unit-type distribution substations stepping down usually to 4 kv. for primary distribution.

In the field of system planning, the a-c analyzer is becoming almost indispensable. More and more of these analyzers are being purchased by individual utilities. There are now three on the West Coast alone. The Bonneville Power Administration has had an a-c analyzer for several years; the Los Angeles Department of Water & Power and the Pacific Gas & Electric Co. are just completing installation of boards they have purchased.

Large systems are having difficulty in finding enough radio and carrier channels for communication, relaying, telemetering, etc. At least one large system of the West will use microwave space radio for channel expansion. Coverage tests are now under way.

In the communication field it is to be noted that all utilities are now using two-way FM mobile units extensively for dispatching and service work. Most of this expansion has taken place since the war. Two-way FM radio for sagging-in transmission conductors, cable laying, supervising dredging work, for survey crews and other operations has effected great savings.

Again in the electronic field use of microwaves for locating certain types of faults on transmission lines is being studied. Devices would work on the radar principle. The application holds forth great promise for reducing outage time when such faults occur.

New trends, new developments, new designs and techniques and new philosophies are developing so rapidly in the field of power-system engineering that necessarily only an outline of some could be covered in this discussion. Sufficient new practice and trends have been mentioned, however, to support the statement first made, that the power engineer still has problems and that 60-cycle engineering still offers interest, romance and a promising future for the young engineer.

Old Pueblo Lit Up

Electricity for the first time lights ancient Tesuque Pueblo near Santa Fe, N. M., at the touch of Catherine Romero, well-known for her pottery. Life in the old pueblo was little changed from the days when Spanish explorers first set up the type of government still used, until the younger generation returned from the recent war. Now, however, as Alex Barnes, Public Service of N. M., puts it, "youth with its progress and advancement will be served—and our company will serve them."

INTERDEPENDENCE PAYS

and the selling of adequate wiring to prevent circuit saturation will take the combined efforts of all the industry, PAT L. LOWRY, field director, National Electrical Contractors Assn., Washington, D.C., told the Business Development Section annual conference, Northwest Electric Light & Power Assn., at Victoria, in this challenge to real cooperation

THERE is a great deal of thought and talk going on these days about electrical interdependence; most attention is directed to the mutual business promotional activities made possible by the idea that every segment of the electrical industry depends upon the other for the welfare and prosperity of each group and each individual. From that fact there is reason, very correctly, to believe that to a great extent in this industry of ours we are our brother's keeper.

The organization which I represent —the National Electrical Contractors Assn.—has subscribed enthusiastically to the interdependence creed, so have electrical manufacturers, so have electrical wholesalers. There is little doubt but that the utilities soon will formalize their support of this cooperative attitude conceived 35 years ago by the founders of the four constituent segments of the great electrical industry. At the present time, intensive work is being done to develop a practical application of electrical interdependence. This application takes the trend of developing business for the electrical industry. It is perfectly obvious to any one of us in this industry of ours that the common denominator of our prosperity and welfare is the increased use of electricity.

Your business depends upon increased electrical use. You cannot stand still. You must keep on the move pursuing a fleet-footed kilowatt-hour as it races up the curve on charts showing consumption of electrical energy. You don't mind this foot race. It means business for you, money in your pocket, shoes for mommy and the kids, and something else that you should be eternally grateful for—a higher standard of living—and a greater satisfaction of wants on the part of all whether in or out of the electrical industry.

This is true whether you are a contractor, a wholesaler, a manufacturer, utility representative or an employee of any one of these segments of our industry. It is true of the electrical inspector, the engineer and the office worker. It is just as true of labor as of management.

So our mutual job is to increase the use of electricity and the way to do this job, in addition to normal group and individual company sales and promotions, is for each one in the industry—the more than one million of us—to do a better job of personal selling. The interdependence program has in mind the development of back-fence selling—not as a pastime but as a means to job security for all of us.

It makes no difference whether I sell an electric toaster to my neighbor or sell him a new 100-amp. service. If you are a manufacturer of cable, it is to your interest to sell your neighbor an electric clock even though it might take 100 clocks to require a nickel's worth of additional wire, but somehow in the process the demand for goods and services created by what you sell comes around and back to you. You will profit.

This is the essence of the electrical interdependence program now being whipped into shape! We look at it as the spine of the long-range industry promotion effort. While we are waiting for the practical application of this sales building aspect of the program, let's take advantage of the time to get some straight thinking done on the matter of electrical interdependence.

We previously noted that the expansion of electrical use is the foundation of our well-being. Electrical use is expanded by an ever-increasing sale of apparatus and appliances that consume electrical energy. Now, assuming that one million folks in the electrical industry roused themselves to selling so that two outlets were demanded where one was demanded before, that would be an epic achievement in sales, but sales do not complete the story.

There is a matter of handling this increased demand in a manner that will bring the maximum of customer satisfaction so that he will keep coming back for second and third helpings of electrical living and doing. Delivering customer-satisfaction is definitely a job for electrical interdependence.

Circuit saturation or the inadequate wiring of homes is recognized as a major fault of our industry. It is just as important that customer satisfaction be delivered with the present level of electrical use or at a reduced level as it is to see that this priceless ingredient goes with the added portion resulting from the interdependence promotion. So, it is past time that we looked into the matter and did something about it. To wipe out this threat to electrical industry prosperity, it is imperative that we all act now on a united front to prevent circuit saturation.

What constitutes customer satisfaction?

In our business, it means that efficient and safe performance at a reasonably low cost must be delivered to the customer and that it must be followed up by a genuine service attitude, as the principal commodity of the electrical industry is service.

That isn't always done.

One obligation of ours is to sell the importance of adequate wiring to all prospects and customers.

There are entirely too many of us in the electrical industry who see an opportunity to make a quick sale or capitalize on a situation, who exploit an opportunity without regarding the consequences. Electrical living is not possible without adequate wiring, and because it is such a technical subject, entirely lacking in glamor, it is a subject that must be constantly kept before the public if it is to be properly sold.

We have some contractors cutting the heart out of an adequate system for the sake of getting the job, hoping to eke out some profit from the shambles. We have manufacturers selling equipment directly to large industrial and commercial users without too

much regard for adequacy of installation and with no regard for what such a policy does to their established distributors and contractor customers upon whom they must depend to sell the hundreds of smaller consumers comprising the bulwark of the market. We find jobbers with the audacity to design a complex modern lighting system from a fixture catalog. What is happening here? Are we paying lip service to electrical interdependence to cover up our stupidity and greed?

According to one of your own people there are two types of electrical contractors. The first type is aggressive and operates in a businesslike manner. He submits a bid on a prepared wiring layout in writing, closes the deal by having a customer sign a contract and installs the wiring in a workmanlike and safe manner. When the adequate wiring program is explained in detail to this type contractor, he will give his active cooperation. The other type of electrical contractor carries his complete office and bookkeeping equipment in his vest pocket or hat and can give a bid, install the wiring and collect his fee all in one breath. The first type denotes clearly the qualified electrical contractor or NECA member. The second type is a potential member of ours whom we hope to convert through education to the first type, or a qualified contractor.

What is happening here is that there are men who are ignoring the example and lessons of experience and are adopting uneconomic practices. For a short time they may gain, but sooner or later the folly of their ways will become apparent even to their hair brains. The chickens always come home to roost.

Today, we find established distribution system under criticism. There are reformers about, who figure it out on paper that the middleman is Public Enemy No. 1; that the wholesaler is a parasite; and that the electrical contractor is a two-gun Jesse James; the manufacturer and the utility are red-eyed monsters with u n s p e a k a b l e names.

On paper, a logical case might be developed for the elimination of the jobber, yet those who come up with this answer fail to reckon with many complex interplays of market, custom, transport, storage and finance. On paper it might be shown that a superior way to handle the job would be for the manufacturer to sell Farmer Jones directly out of a mail order catalog. Farmer Jones could then get an electrician to install it, or perhaps Farmer Jones would attempt to install it himself. Perhaps Farmer Jones gets killed in the process of installation. How long do you suppose there would be maintained a supply of competent electrical mechanics with all the answers and know-how gained through diverse experience on tap for push-button responses in such conditions.

You look out on the folly of this thinking. You soundly condemn those who would upset proved and established practices. You are inclined to call them "un-American." Yet, we find ourselves setting about to upset tried and tested policies and procedures by chiseling and taking short cuts to immediate profits. We do not think ourselves un-American. Perhaps we should get Congress to pass a law providing that to be a damned fool is to be un-American, and let the Congress so tell the Department of Justice so that all such people could be deported forthwith. Then, perhaps we would have Utopia in the electrical industry. There is real danger in this. Sometimes I fear that it might depopulate the country.

The point that I would like to make to you is: That for any electrical interdependence program to be effective, there must be clear thinking, clear development of policies, and the unswerving execution of these policies. We are competent to know what is best for us and our customers, the public. Our record extending back more than 50 years, showing activity and growth in the public interest, is much more imposing than that of any politician, group of politicians or economic reformers. As a prelude to our forthcoming Big Interdependence Promotional Drive, let's think this thing through and arrive at *decisions*. Then, let each of us, individually, and in his own enlightened self-interest apply them.

Spinning machine used for installation of supervisory control and pilot wire relay cable by Central Arizona Light and Power Co. Circuits to protect the 12 kv. subtransmission loop in the Phoenix area were bound to a 3/8-in. galvanized messenger with 0.061-in. wire. The spinner passed easily through dense foliage

Panel discussion on public relations highlighted the annual spring conference of the Rocky Mountain Electrical League in Santa Fe, N. M., April 22-23. "Board of experts" included H. L. Pinkerton, W. N. Clark, Neil Simpson, Moderator G. B. Buck, J. W. Cryder, J. A. Bullock (league president), and E. T. Tengdin. Record registration was 171

RMEL Conference Stresses Public Relations

"STUMP the experts," was the challenge of G. B. Buck, moderator of a panel discussion on public relations which was one of the highlights of the annual spring conference of the Rocky Mountain Electrical League. Reactions of the record group of 171 in attendance at Santa Fe, N. M., April 22-23, were immediate and positive. The board of experts, made up of half a dozen presidents and vice-presidents of utilities from South Dakota to New Mexico, was bombarded with questions from the floor on employee training programs, handling of customer complaints, participation in community activities and a host of others pertaining to public relations. Resulting discussion from both sides of the panel clearly indicated the greatly increased importance and attention being given to "the art and science of getting along with the public." Need for a change in attitude on the part of the utilities was discussed, with a proposal that public relations should be a positive program —one where the utility accepts and aggressively discharges its civic responsibilities as one of the leading industries of the community.

Parallel sessions of the Engineering Division under J. E. Wilson, and the Accounting Division under D. P. Roberts covered a wide range of subjects. Of major interest was a paper prepared by J. F. Emery of Idaho Power Co. on the company's 7,200/12,456-volt distribution system. After a brief description of the cutover of the system to the higher voltage, begun nearly 20 years ago, Emery indicated they were thoroughly satisfied with it. He said that he believes not only 12.5 kv., but also 25 kv., will probably soon be used extensively for power distribution. A comprehensive paper on power circuit breaker applications with emphasis on interrupting capacity and special problems in this area because of high altitudes was presented by H. F. Gidlund, Public Service Co. of Colorado, and F. C. O'Kelly, General Electric Co.

The Accounting Division was told by Neil Simpson, Black Hills Power and Light Co., that a year's experience with simplified rates had shown them to be a definite asset in public relations. As an example, he pointed to the excellent acceptance the company had received for a recent 10% rate increase. Importance of selecting personnel with careful attention to capacity for future growth, as well as need of an accurate job specification for satisfying immediate job requirements, was stressed by R. H. Joyce, Public Service of Colorado, in a paper on *Selection of Personnel.*

Following the panel discussion, the joint session under President J. A. Bullock received a very favorable report on acceptance of the Go All-Electric program adopted by the league last fall. Speaking for his company as a participant, DeLamar Holt, Western Colorado Power Co., cited acceptance of the program by customers, and pointed out that the industry now has a promotional program it can sink its teeth into and get results.

High spot of the well-planned meeting was a trip by 70 members the final afternoon to the Los Alamos establishment of the Atomic Energy Commission—the first time a group this size has been allowed in the area.

Pueblo Chapter

Dormant since 1942, the Rocky Mountain Electrical League Chapter at Pueblo, Colo., was revived at a recent meeting, and an ambitious program of activities undertaken. Fred Voss, previous chairman, conducted the meeting but insisted on relinquishing the post. Lou Matthis, Vidmar-Matthis Appliance Co., was elected chairman; G. K. Tanner, Tanner Appliance Co., vice-chairman, and E. H. Pemberton, Southern Colorado Power Co., secretary - treasurer. Ralph Hubbard, RMEL manager from Denver, M. Metzner, Adequate Wiring field man, and J. E. Wilson, Colorado Central Power Co., attended the meeting. The newly organized league decided to put on a home freezer promotion in May and to stage a big electrical exposition in Pueblo in July. It will be unique in that plans are being made to hold it outdoors, blocking off one of the streets. It will be held jointly with an industrial show, an Inventors Congress, and other festival activities of the Chamber of Commerce.

● EDWARD C. HUNT, PG and E, San Francisco, has been appointed chairman of the safety rules committee recently established by PCEA.

NECA District 6 Gets Together at Portland

NECA District 6 meeting personalities: E. R. Cornish, field representative, NECA for District 6; P. L. Lowry, field director, NECA, Washington, D. C.; I. W. Rodgers, Portland Chapter manager; S. I. Jagger, Portland Chapter president, A. R. Johnson, past president; and T. L. Rosenberg, NECA vice-president

ALTHOUGH its slogan was "Sell all NECA services, not labor relations alone," said labor relations managed to monopolize most of the two days of intense conversation about urgent problems of the electrical construction industry that concerned the District 6 meeting of National Electrical Contractors Assn. at Portland, May 15-16. Labor costs, wage demands, pension and vacation plans, shortage of supply, apprenticeship training, perverse working rules —and ironically opposite, expressions of cooperation and mutual assistance. Contractors and the union are like the Irish family that fights constantly among itself, but divil the man who tries to come betwixt them.

It was the second annual district meeting, a gathering of chapter managers and officers from the Seattle, Spokane, Salt Lake City, Portland, San Francisco, Sacramento, Stockton, Northern California, Southern California and San Diego chapters, with Portland Chapter and its president, S. I. Jagger, Jagger-Srouge Electric Co., and manager, I. W. Rodgers, as hosts. T. L. Rosenberg, District 6 vice-president, Oakland, presided. P. L. Lowry, field director, NECA, Washington, attended in lieu of Paul Geary, executive vice-president. E. R. Cornish, field representative, District 6, assisted in arrangements and program. Attendance was 35.

From it came a promise that NECA would place another field man, temporarily E. L. Santschi of St. Louis, in the Idaho, Montana and Utah territory and eventually a new District 10 would be formed of those states and Wyoming and Colorado, to coincide with IBEW districts. Newly appointed field man, Cornish, who likened himself to a fireman, trying to put out labor "fires" in every part of a vast West, urged more chapter participation in the NECA's revived research and estimating activity. This and the sales promotion program of NECA on guaranteed wiring were discussed also as a part of the idea of using more of NECA's services than just labor relations.

But it was on the economic effects of present labor difficulties that contractors talked most. Justly so, since it was said that 70% of a contractors' business deals with labor. In the line constructors section, which has a chapter in the Northwest, the demands of linemen for still higher wages and ridiculous working conditions is placing contractors in a poor position to obtain utility line construction. Although an area agreement has been entered into for work anywhere in the region, the disparity between utility wage rates and contractors' tends to

T. L. Rosenberg, District 6 vice-president, and Warren Penn, Southern California Chapter manager, get acquainted with Gene Heiss, recently appointed Northwest representative for IBEW, formerly of Imperial Valley, who gave a short welcoming talk. At right, Norman Ferguson, San Diego Chapter governor, coaches "Fireman" Cornish

eliminate them from power company contracts.

Recent wage increases were negotiated in San Diego and Los Angeles, it was announced. In San Diego the journeyman's hourly wage went up from $2.25 to $2.35; in Los Angeles to $2.40. Vacation plans were eliminated from the bargaining in both cases. Other wage increase negotiations were said to be in process in most of the West. Only in the Oakland area, as yet, has the demand been pushed for pooled vacation with pay. The outcome of that controversy has not yet been announced.

The operation of the Council on Industrial Relations for the electrical contracting industry was described in detail by both Rosenberg and Lowry. Both emphasized the advisability of using this "supreme court" of the contracting industry to arbitrate disputes.

W. J. Varley, San Francisco Chapter manager, made a strong plea that all chapters seek from the union a maintenance work scale to enable contractors to be in position to get this work, instead of plants and office buildings having their own maintenance crews. Methods of selling maintenance contracts were also discussed. The annual wage was talked about as a solution to the problem.

The still unpopular employees benefit or pension plan also came in for both brickbats and compliments. One statement in its favor was that the national agreement had at least standardized the fee whereas if it had been negotiated separately in each locality there might have been a dozen different types of assessment or fee. Compliance, still spotty, was said to be improving and up to the union to enforce. The latter was said to be making a drive on it and would not endorse any new agreements or renew old ones without the pension program in them.

NECA, it was shown, has prepared a new manual for chapter operation which contains, in more detailed form, the do's and don'ts that were covered in the April ELECTRICAL WEST article on associations. Many of these same subjects were talked about in this two-day session. The present status of the construction industry in relation to the Taft-Hartley act, since the decision of a judge in a Denver Federal court, was said to be unsettled until the Supreme Court rules. NLRB contends that the industry does come under it.

Salt Lake City was selected in the final moments as the place for the next district meeting in 1949.

It was felt by all that the regional get-together of chapters had brought forth greater appreciation of each one's situation, and promoted unity.

Accounting At Spokane

RAISING new capital for added plant capacity and maintaining net earnings to support large new investments are the biggest problems facing management of electric utilities today, said Kinsey M. Robinson, president, Washington Water Power Co., to the Accounting & Business Practice Section of the Northwest Electric Light & Power Assn. at Spokane, May 17 and 18. The meeting was presided over by J. E. Winton of that company, section chairman, and attracted 100 accountants from the Northwest companies and additional representatives of office equipment manufacturers.

The industry's construction job nationally means the installation of 21,000,000 new kilowatts in the next four years, said Robinson, to bring reserve capacity in 1951 up to 15% from its low point of 5% in 1947. This will require $6 billion, or an increase over present capitalization of approximately 30%, a task management has never faced in a like period in the industry's history.

Because of unusual growth in the area, Robinson continued, the Northwest cannot expect to build up adequate reserves until some years later than 1951, depending on how fast McNary Dam can be completed. Private companies have under construction in the next two years more than 500,000 kw., which, with new units at Grand Coulee, will scarcely more than meet expected growth. Maintaining net earnings with mounting taxes and other costs, he said, will place an unprecedented responsibility on accountants.

A. William Morris, tax consultant of Spokane, told the group that the present tax structure was a serious deterrent to attracting risk capital in all industry. He cited as a major contributing factor the double taxation of profits through the tax on corporation earnings and the income taxes of the recipients of dividends. This may take as much as 98% of the profit dollar paid out in dividends, he said, and even in the case of medium-sized incomes will take 50%. He showed how taxes had been used to regulate competition, both through the imposition of punitive or coercive taxes and by the exemptions, exceptions and exclusions granted such institutions as cooperatives, PUDs, incorporated labor unions, lodges and other allegedly non-profit enterprises, which had invaded the field of private business.

With this background of fundamentals, the meeting got down to a tight agenda of timely reports and discussions, starting with a report by A. F. Elder on making reports to management more quickly comprehensible. Visual presentation using graphs and charts was advocated. A careful scheduling of the work of monthly closing was shown to be an aid in getting the reports of essential financial facts and statistics against the budget were highly important, it was said.

Under the discussion leadership of Ralph W. Lawlor, Pacific Power & Light Co., several new angles of meter reading and billing were explored. Earl H. Martinson, Washington Water Power Co., told of methods by which his company had developed a uniform meter reading sheet covering all classes of service. Three different sheets were designed and scored on the basis of practicability from the standpoint of reading and billing, and the sheet receiving the highest score was chosen. It is good for 30 months reading and routes are rewritten on a cycle basis, so many each month. F. A. Fussner, Puget Sound Power & Light Co., explained a method of mapping and establishing permanent meter reading routes. The company is still reading bimonthly, an outgrowth of wartime economy. E. W. Bredemeier, Portland General Electric Co., discussed the possibility of reading meters in units of ten as a further economy in reading and billing. The Washington Water Power Co's system by which accounts are billed and mailed within 24 hours after receiving meter books, using IBM equipment centralized in the Spokane office, was explained by J. E. Winton of that company, and a time was set aside during the meeting for an inspection of this system by the delegates.

Under the plant accounting discussions, led by A. C. Alford, Portland General Electric Co., methods of allocating executives and administrative salaries to construction, unit cost studies for retirement, and methods of controlling plant accounting in the field were discussed. The segregation of depreciation reserve by functional groups was also under discussion in this part of the program, indicating that most companies are carrying such segregation in compliance with FPC requirements. What, exactly, is an adequate reserve is very difficult to determine. The practice in some cases of requiring companies to set up large additional reserves now, when rates in the

Mann Lawler Tye

Elder Bredemeier Fussner

past have not been sufficient to produce such reserves is unfair, it was pointed out.

Considerable interest was aroused by J. R. Lawson's explanation of the on-premise coffee shop operated by Washington Water Power Co., as a means of minimizing the off-premise coffee drinking habit. The coffee shop opened last July, serving coffee, milk, fruit juices, soft drinks and a small line of bakery goods. The management has legalized 10- to 15-minute rest periods twice a day. Lost time from coffee drinking has been greatly reduced and employee morale has increased. The shop is run by the company at cost.

Centralized control of stationery and forms has been instituted in the Washington Water Power Co., according to Earl H. Martinson. Before forms are reissued or new ones authorized, they go through a process of study as to design, use and methods of production, with economy in view. It was shown that, without such control, wasteful methods crept in. In discussion, F. Copithorne, B. C. Electric Railway Co., stated that as a wartime conservation measure, the B. C. Electric Railway Co. saved 13 tons of paper by examining and redesigning its forms.

T. W. Fryou, Portland General Electric Co., advocated the setting up of liability for vacation pay, sick leave and other allowed times against which would be charged the actual payment of such time.

R. W. Peterson, Puget Sound Power & Light Co., was named vice-chairman of the section for next year, after F. Copithorne, the present vice-chairman, takes over the chairmanship.

Quick Catch-up

IEEDA

Inland Empire Electrical Dealers Assn. is working with the Spokane Federation of Women's Organizations in a customer-dealer program to be administered in Spokane. Plans are being mapped out by the Appliance Consumer Bureau consisting of representatives of the club federation and the Inland Empire association. Clubwomen in other Inland Empire communities will work with electrical dealers.

The group is working on consumer panels, questionnaires and polls to obtain the opinions of a large number of women. Another contemplated project says Robert L. Wilkinson, executive secretary of the dealers group, is to make a research of methods of using new types of appliances by studying actual home operating conditions.

A Shoshone County Chapter, Idaho, of the Inland Empire Electrical Dealers Assn. was formed recently at Lewiston, Idaho, with Ralph Wickberg as president and Vernon J. Nelson as secretary.

James F. Boothe of the Brown-Johnston Co., Spokane, who is president of the Spokane Chapter, presided at the organization meeting. F. A. Tool, Spokane Chapter secretary, and Robert L. Wilkinson, Spokane association executive secretary, were speakers.

New president of the Inland Empire Electrical Dealers Assn. is John F. Boothe, president of the association's Spokane Chapter. Charles Fanning of Oakesdale, Wash., will serve as vice-president; F. A. Tool, secretary of the Spokane Chapter, as secretary; and R. W. Burch, president of the Coeur d'Alene, Idaho, Chapter, as treasurer.

Other governors representing various chapters of the association are Carter Crimp and Gordon DeFoe, Coeur d'Alene; John Nanninga and J. J. Fox, Lewiston, Idaho; S. C. Had-

Alford Peterson Fryou

Copithorne Winton

dock, Moscow, Idaho; W. E. Snyder, Washtucna, Wash.; Ralph Wickberg, Kellogg, Idaho; Stanley Densow, Spokane; Ed Jones, Grangeville, Idaho; Winn Self, Odessa, Wash; Vern J. Nelson, Wallace, Idaho; L. A. Winn, Pullman, Wash.; and Fred J. Williams, Davenport, Wash.

Electrical Contractors' Assn.

Electrical Contractors Society of Washington State has scheduled its 1948 convention for Sept. 25 - 26 at Everett, Wash., reports T. R. Nielson, secretary-treasurer. Delegates from the society's 14 chapters will attend. Action is expected on proposed legislation to be presented to the 1949 state legislature, including an all-contractors' law which would require the licensing of all contractors, a permit fee system which would license all journeymen and some method of sales control.

At an organization meeting of the Alberni District Electrical Contractors' Assn. held recently in Port Alberni, B. C., George Bailey was elected president, and Lionel Houle named secretary-treasurer. Stanley Carlson, Electrical Service League of the B. C. Nanaimo office, was chosen an honorary member.

EMEA

Southern California Section held a lively meeting in April—20 new members received membership cards and buttons; Pete Shrader was presented with a home portable drafting board and machine for his good work on the recent EMEA Show; guest speaker was A. M. Tompkins with a talk on electric heat in industry; members also heard Dr. Sorrenson of Cal Tech. tell about the new state professional engineers registration; Frank Short was on hand to coach the discussion on Code . . . May meeting had A. B. Perry on the program with a discussion on waterproofing electrical equipment. Perry is manager of maintenance division, Refinery Maintenance Co. Inc. Earl F. Ireland was referee of the month's Code discussion.

Problems in building the Anderson Ranch Dam in Idaho were explained at the May 27 meeting of the EMEA of Northern California. Field representatives W. A. Whitehead and J. P. Gormly of the Goodyear Tire & Rubber Co. presented the story of the dam with a technicolor sound film.

NECA

Rocky Mountain Chapter held its Architects and Engineers Seminar on April 12, 19, 26 . . . Contractors and estimators symposium was staged on May 3-4 . . . General meetings are scheduled at Laramie, Wyo., on May 27 and at Denver on June 7.

Association of Appliance Dealers

Association of Appliance Dealers, Seattle, has elected W. A. Watts as its president and Earl Brockett as vice-president. Directors are W. B. Clibborn, W. Howland, M. B. Johnson, H. E. Soden, C. L. Guinn, W. Carleton, Fred Brickley and J. D. Gawne.

IES

Northern California Section met in San Francisco to hear Richard G. Slauer, manager of the application laboratory, Lighting Division of Sylvania Electric Products, discuss the application viewpoint of trends in fluorescent lighting over the past ten years—using slides and new and odd lamps to illustrate his talk. May 17 dinner meeting at Treasure Island included an informative address by Dr. Gordon L. Walls, U. C. professor, on the mechanism of color vision illustrated with slides and demonstration equipment.

Tenth anniversary of the fluorescent lamp was discussed by Ernest Dee, G-E Lamp Dept. at a Utah Chapter session of IES; program also featured James C. Littlefield with a speech on the growth and development of the Utah Chapter . . . F. I. Wilson, sales manager, Wakefield Brass Co., spoke at the May 18 meeting—his subject, Modern Commercial Lighting.

Southern California Section at its Ladies' Nite meeting on May 5 had J. W. Howard, district engineer, General Electric Co. lamp department, give facts on the latest developments in lamps and lighting.

Electric Clubs

At Portland members saw a film showing snow measuring methods used to furnish information for irrigation and hydroelectric projects. Movie was produced by the U. S. Soil Conservation Service.

Roy A. Wehe gave San Francisco club members the facts on the electric power situation in Germany at the April 26 luncheon meeting . . . following week speaker of the day was Ray Turnbull, vice - president of General Electric Co., with a message on "job customers" in the electrical industry.

Captain Ranson Bennett II, director of U. S. Navy Electronics Laboratories, Point Loma, Calif., reviewed for San Diego Club members the extensive electronic research that is going on.

Los Angeles club members witnessed a premiere showing of the Los Angeles Department of Water and Power film illustrating the growth of the L. A. power system—the 30-minute film reviewed the entire development of the lower Colorado River to date. Brief introduction was given by chairman of the day Charles P. Garman, chief electrical engineer of the L. A. Department of Water and Power.

Victoria Electric Club elected its new officers at a recent dinner meeting. Ernie Emery, Emery Electric, Victoria, B. C., was chosen to head the group, with Jack de Bourcier, Northern Electric Co., as vice-president and R. W. Patrick, B. C. Electric Railway Co., as secretary. H. S. C. Archbold, manager of the Victoria branch of the Electrical Service League of British Columbia, is treasurer. Directors include A. Lutes, W. E. Holland, K. Reid, G. Duck, A. Taylor, A. Food, and G. Langdon.

Vancouver Electrical Assn.

Leonard Sewell, Rickets-Sewell Co., has been re-elected president and H. J. Hutchison re-elected vice-president of the Vancouver Electrical Assn., Vancouver, B. C. New secretary is R. Beaumont succeeding J. S. Homersham, who occupied the post for eight years. The latter was presented an electric blanket. R. Sutherland will serve again as treasurer. Directors elected for a two-year term include R. Hall, J. Matthews and J. Craig. Annual dinner, May 12, was addressed by T. C. Clark, president Electric Service League; L. H. Miller, city electrician and Jack Stead, assistant to T. Ingledow, chief engineer. H. L. Taylor, who retires June 30 as Provincial electrical inspector, was presented a fishing rod and reel in appreciation.

IAEI

Utah Chapter met on May 11 with Douglas Peck leading the Code discussion from Section 3201 to 3383. Final decision between Salt Lake City and Ogden for the section annual meeting in September has not yet been reached.

Puget Sound Chapter held its regular quarterly meeting in Vancouver, Wash., on June 5, in order to interest Oregon inspectors in forming a chapter in that state.

Western Safety Conference

Tenth annual Western Safety Conference will be held June 16-18 at the Roosevelt Hotel in Hollywood, Calif.

NISA

B. C. T. Elworthy of Elworthy & Co., Ltd., Vancouver, B. C., was recently elected a director for region 15 of the National Industrial Service Association. A chapter of the association was recently formed in B. C.

ELECTRICAL WEST

Federal Power Policy

IMPACT of federal power policy (or lack of it) on the electric power business of the Far West is set forth in three articles in this issue. One emphasizes the dependence of the Pacific Northwest on the federal government for its electric generating capacity. A second states the case of the Rocky Mountain utilities against the proposed USBR program to parallel their transmission networks. The third proposes a means of financing future federal power projects in this region so as to free them from the whims of Congressional appropriation committees.

Because of the importance of all of these subjects to the future of the area, we commend these articles for careful study. The first situation could involve a serious power shortage. The second is a major socialistic threat. The third would strain some of the political hooey out of federal power projects and set them up on a practical economic basis.

Too Many Experts

ANY business that is closely allied with the performance of a public service is involved in all sorts of relationships with governments. This is especially true of the electrical industry in all of its branches. Power companies in particular have their troubles with government agencies. Their experiences parallel those of the air transport industry in its dealings with bureaucracy. W. A. Patterson, president of United Air Lines, claimed in San Francisco recently that these difficulties stem from too many experts. He classified these into three groups.

First group of experts consists of recent college graduates filled with ambition and zeal as well as text book theories. These they direct toward the writing of long and usually immature theses. Second group consists of individuals who have been abject failures in the business world. They cherish the opportunity to be bitterly critical and condemnatory. The third and last group consists of the real conscientious and able experts. They, however, almost to a man, are seeking an opportunity to get out of government service and into private business.

This is not a very pretty commentary. Maybe it could be corrected if the government services could be made as attractive as industry. Too many good men try it and leave with the comment, "we can't take the beating."

"Tell Me Quick"

"TELL me quick and tell me true, or else, my love, to hell with you!" So goes a poem from *Tide* magazine that currently is achieving great popularity. Well it might, because the ditty points up the need for talking frankly with employees, customers and stockholders. If management—and we mean those who own or run any kind of an electrical business — will heed the moral, then some of the friction and misunderstanding that exists might be eliminated.

The need for keeping workers informed of the plans and policies of management was never greater. The reason is obvious. Both government and the unions are regularly and assiduously presenting workers with some of the economic facts of life. Unfortunately many of the so-called facts are prejudiced. Some of them are pure political propaganda. And a few have their origin in organizations of doubtful purpose and questionable patriotism. They play upon the psychological fact that suspicion and mistrust breed upon lack of information and upon misinformation.

To offset such efforts management must speak up, and particularly take the worker into its confidence. Some enlightened electrical organizations are doing just this. We know an electrical contractor who writes regularly to his people. He addresses the letters to their homes and he doesn't mince words. A wholesaler sends a weekly management letter to all of his supervisors. It reviews industrial relations developments and company activities. One utility manager sends a monthly newsletter to the homes of some 1,800 people in his organization. It talks about everything from community developments, rate matters and over-all business conditions to union relationships.

Such organizations, however, are the exceptions. The great majority of companies do nothing. Unless they, too, become enlightened, the

EDITORIAL VIEWS

time may come when the sentiments expressed in the poem may apply—"or else, my love, to hell with you."

Sales Policies Under Pressure

NEVER a dull moment in this business! From high production to curtailment, to war, to stopped production, to black market, to resumed production, to catching up with demand, to price cutting again, to possible further curtailment—and this is where we came in on the continuous performance, isn't it? The play and counterplay of economic pressures on distribution policies is devastating to the morale of the sales groups in the industry. They hardly know where they stand or whom to trust.

Manufacturers with greatly enlarged facilities to produce appliances suddenly catch up with the backlog. Their operations are based on volume mass production. Warehouses start to fill with product. It isn't moving fast enough at the sales end. With high costs and hard-to-get personnel at last, they dare not slow down. What to do? Cut price? Load the dealers with inventory? Do both? Seek faster chains of outlets such as big national mail order houses?

The pressure is great. Sometimes the management is new. There have been changes and shifts of former key men with distribution experience to other factories, with replacements from less well-versed young men who really had never been through these policy struggles before the war. After all that was eight years ago.

So many new factors have entered the situation too. Utility companies no longer are major dealers doing large volume business. So many new dealers have entered the field. So many kinds of dealers who never handled appliances have taken them on. Because of their merchandising reputation the eager manufacturers rush in to franchise them with their lines. Sight is lost of the steady, reliable and efficient dealer who handled the line before the war, serviced it through the war, and has built a solid clientele in his community. "What price loyalty to a line?" he asks himself, "what price past record of selling and upholding the product name?"

Among those that are hurt rises the cry for retaliation, for something drastic to "teach" the manufacturers and distributors a "lesson." Anger and suspicion replace trust. Attention is diverted from the real solution, more intensive selling effort, toward destructive thinking and acting. Yet it is only teamwork that will solve the difficulties that plague all.

These are times and conditions that test the integrity of sales policy, the integrity of sales management and back of that, of manufacturers themselves. Without integrity there is apt to be selling chaos. It is urgent that this be realized—now!

WE are a business enterprise—dependent for success on the high quality and fair price of our service; on the skill, courtesy and loyalty of our employees; on the confidence of our investors; and on the ability of our management to forecast and provide for the steadily increasing electric power requirements of our area. In the conduct of our business it is our policy to render service of the highest quality to our customers—promptly, courteously and efficiently—at prices consistent with a policy of paying fair wages and affording job satisfaction and security to our employees; providing modern facilities for our customers' expanding needs for electric service; and paying a fair return to our investors who have provided the funds to make such service possible. As a private enterprise entrusted with essential public service, we recognize our civic responsibility in the communities we serve. We shall strive to advance the growth and welfare of these communities and shall participate in civic activities which fulfill that goal . . . for we believe this is both good citizenship and *good business. These principles, clearly affirmed and honestly carried out, will merit the confidence and goodwill of customer and community, employee and investor.*—A Statement of Policy of the Union Electric Company of Missouri.

NORTHWEST ASSOCIATION CHALLENGED

"Inadequate Wiring Still Worst Bottleneck"

BILL Mainwaring opened with a welcome and closed with a challenge. And in between the two, what a wealth of ideas and information affecting every one in the electrical industry in the Northwest.

Such an exclamatory statement but weakly describes the scope of the annual conference of the Business Development Section, Northwest Electric Light & Power Assn., held at the Empress, in Victoria, B. C., under the chairmanship and guidance of Howard N. Walters, general sales manager, B. C. Electric Railway Co., Vancouver, B. C., May 10-12. W. C. Mainwaring, vice-president in charge of the company's island properties, a past president of the association, played host to the 350 who gathered from five Northwestern states and two Canadian Provinces.

Mainwaring's welcome was total, even to opening his own home to entertain the horde of visitors. His challenge was just as genuine. Asked to sum up the three-day conference, instead he said he must be critical. Since 1918, he recalled, every meeting had talked and agonized about inadequate wiring and made a few passes at the problem. But 30 years later it is more of a bottleneck than ever. "With modern demands for electric service we are going to see the day when five to seven thousand kilowatt-hours per domestic customer will not be excessive. So far we are not doing even a half decent job to provide facilities for electric service."

Money must be put into it, through electric service leagues; manpower must go into the field and sell it. "What has been put into it so far has been peanuts compared to advertising expenditures on appliances that can't be used unless there is wiring to serve them," he said. It is something that must be done industry-wise, he maintained.

In the absence of Tom Roach, Idaho Power Co. president and president of the association, W. L. Thrailkill, association vice-president and assistant general manager, Washington Water Power Co., Spokane, gave the meeting its keynote. He said that managements are beset with many difficult problems and desire advice and assistance to overcome them. It was his hope that the conference would contribute toward such solutions.

Wiring was injected into almost every bureau and general meeting, due to the energetic Homer Bender, Washington Water Power Co., Wiring Bureau chairman. P. L. Lowry, field director, National Electrical Contractors Assn., the bureau's speaker on the first general session, linked the interdependence of the industry in its concern over wiring. His paper is presented in full in another part of this issue. E. W. Rice, National Electrical Products Corp., Pittsburgh, offered the Electric Home Bureau a sales program for adding to the adequacy of old houses through simple installation of multi-outlet assemblies (e.g. Plug-In Strip, Pierceway, Plug-Mold, and similar moldings). The duplex outlet, he proved, has failed to keep up with the gain in need for more properly placed outlets. He outlined a program for requiring homes a room at a time, on a scale like the Better Light — Better Sight campaign. In the Rural and Farm Bureau, the wiring group had Arthur Mayer lead a round-table talk on the importance of wiring to farm electrification. To C. W. Coleman of Utah Power & Light Co., the first prize of $50 was given for a winning slogan, *Wire Today for the Needs of Tomorrow.*

Robert Gros, advertising and publicity manager, Pacific Gas and Electric Co., San Francisco, stirred the audience with an inspiring talk on world conditions and the spread of communism as observed in a recent tour of the South Pacific and the Orient. In the advertising committee meeting later he let his hair down to tell the Northwest power companies now not to get *Caught with Your Kilowatts Down*, as his own company had in the recent California drought and power shortage. Crux of his advice was to prepare the public, ask its aid, not wait until a crisis developed.

The address of A. E. Grauer, president, B. C. Electric, *The Economics of the Electrical Industry*, will also be published later. In it he weighed the demand against the supply of electricity, told what is being done in the Northwest Power Pool to meet the demand (to which, by the way, he said B. C. Electric would soon contribute from its new Bridge River plant) and asked for a clear-cut power policy on the part of governments. Fred Holz, Reddy Kilowatt manager, told the surprising results of surveys among children of school age and their attitude toward public utilities.

A. S. McCordick, vice-president of Moloney Electric Co. of Canada and president of the Canadian Electrical Manufacturers' Assn., discussed the role of the manufacturer as the supplier of generating and distributing equipment and of appliances and utilizers of electricity which must rely upon the other branches of the industry to reach the public in order to serve it.

Howard Emerson, Pacific Coast associate editor, *Electrical Merchandising*, told how important to all the replacement market is. Quoting the late Les Moffatt who declared succinctly that "the replacement market is necessary for the continued prosperity of the industry," Emerson indicated why. With generating capacity shortage, the replacement market is the hope of survival of the dealers and distributors, which the utilities and manufacturers both need in the future when it will be necessary to sell power aggressively again. He analyzed the market, saying that present trade-in rates indicated that only a very little of this market is being worked. Shortages are rapidly disappearing and dealers cannot live on new customers alone. To sell this market, he concluded, will take both a mental preparation or change of viewpoint and a physical preparation. It definitely is a market that must be sold, it will not walk into the store to buy.

Each of the bureaus conducted what was almost a full-sized conference in itself during the day and a half of parallel sessions.

Electric Home Bureau

Electric Home Bureau, under W. C. Mearns, B. C. Electric, Victoria, heard a review of home service activity on Monday. Miss Jean Mutch of B. C. Electric presided. Marguerite Sablin, Harper-Meggee Inc., Seattle, explained the methods used in planning home laundries and of teaching dealer personnel how to demonstrate laundry equipment. She discussed various detergents and their action on various fabrics. Mrs. Edith Rauch told of cooperative work with appliance dealers, teaching their sales people to cook, conducting demonstrations in their stores. She also told of very successful

cooking classes for teen-age girls during vacations.

The indoor climate committee, headed by R. E. Sinclair, held Tuesday morning's meeting. Sinclair himself reported that use of ground coils for sources of heat in Portland heat-pump installations had not proved satisfactory. Instead there was considerable freezing of the ground and a steadily lowered ratio of heat exchange. G. H. Pike, Portland General Electric, presented a chart his company had worked out on the relative costs of various methods of heating a house. H. N. Hoss told of panel heating examples in Portland, their load, demand, size, and kw. consumption. Utilities have little enthusiasm for it, he intimated, but it has strong public appeal.

Wednesday morning Ralph Gale, Idaho Power Co., had his electrical equipment for the home committee session. His own report on the degree of adoption of NEMA water heating standards by eight companies was revealing. One or two companies are sat-

Among the speakers, officers and bureau chairmen at the Victoria conference are those in the five pictures here. Numbered from the top, the first was taken while A. E. Grauer, president, B C. Electric Co., addressed the Tuesday luncheon. At his side was Fred Holz, Reddy Kilowatt service, the other speaker, and W. L. Thrailkill, association vice-president. In picture 2, at the Monday luncheon, far left, J. F. McAllister, Utah Power & Light Co., the section's vice-chairman; Mayor Percy George of Victoria; Howard Walters, general sales manager, B. C. Electric, chairman of the Business Development Section and of the conference; W. L. Thrailkill, assistant general manager, Washington Water Power Co., Spokane, and W. C. Mainwaring. B. C. Electric vice-president for Vancouver Island. Picture 3 shows Berkeley Snow, association managing director; W. C. Mearns, B. C. Electric, Victoria, Electric Home Bureau chairman; Dean Pulsifer, Westinghouse Electric Supply Co., Seattle, chairman Manufacturers, Wholesalers, Dealers & Contractors Bureau. Picture 4 is a close-up of McAllister, who will be next year's section chairman, Mayor George, and Howard Walters. Bottom picture is of bureau chairmen: Ralph Gram, B. C. Electric Co., Rural and Farm Bureau; Homer Bender, Washington Water Power Co., Adequate Wiring Bureau; K. E. Hollingsworth, Puget Sound Power & Light, Commercial and Industrial Bureau, and Frank Swearingen, Puget Sound Power & Light Adv. and Publicity vice-chairman for H. J. Merilees

isfied with NEMA standards and use them to their satisfaction. Others still think they have better ones of their own. Main complaint is that dealers tend to sell too small a tank size. In respect to controlling the peak, Gale stated strongly that companies with a high saturation of water heating and whose power capacity is short could gain the equivalent of much total system capacity by off-peaking.

E. W. Commery, General Electric Lamp department, Cleveland, illustrated the new certified performance lamps, their design, performance and what they mean to the industry. With a trend toward small rooms, he said, the newest addition, pin - to - the - wall certified lamps answer a real need. He likewise demonstrated the new reflector-bowl-type of lamp for portables. Bruce Donalson, Canadian General Electric Co., waxed poetic over the electric blanket opportunities. A totally off-peak load builder, with each refrigerator-equipped home a prospective customer for one or more blankets, each using 119 kwh. per year, he added up the total load to 12,000,000 kwh. Retail sales would reach $4,400,000 and gross a million to retailers.

August Jaeger, recently returned to the Northwest as Hotpoint representative, reminded the utilities of their responsibility to introduce the public to new appliances. He then described the services rendered by the dishwasher and disposal, said their load came on off the cooking peak, that they required no additional capacity to serve, gave such a bargain in service that they improved public relations.

R. E. Staples, Portland General Electric, reviewed the operating methods of several automatic clothes washers, their consumption of water and electricity, their combination load when a drver and ironer are used.

R. S. Belnap, G-E Supply Corp., Boise, listed potential home electrical equipment and wattages, totaling 27,325 watts; told the results of tests of dealers' selling ability. Good store fronts, it was found, were not often backed up with effective selling inside. S. N. Johns, Westinghouse Electric Corp., Salt Lake City, gave a quick review of new things soon to be expected from the laboratories as a result of research.

Advertising and Publicity

The advertising and publicity committee, headed by Harold J. Merilees, B. C. Electric, heard Kimball Jack, Washington Water Power Co., reveal the results of a psychological survey of customers to seek the truth about public relations. (An article on it is promised soon). Earl F. Campbell, advertising director, B. C. Electric, punctured advertising budgets with a sharp wit, debunking the executives' deflection of needed money into questionable charities and handouts. Newton Pullen, B. C. Telephone Co., said electric utilities had no monopoly on shortages, told how his company told the public about them, kidded the electrical group with suggestions to popularize darkness. The Research Advisory Service and its value in public relations was presented to the group by both Berkeley Snow, secretary, Northwest Electric Light & Power Assn., and by Ladner Ross, director of the service.

Home economists who reported on the many types of customer and dealer aid service they render included: seated, Lucille Ramirez, Washington Water Power Co., Spokane; Antisell Leask, B. C. Electric Co., Victoria; Jean Mutch, director, B. C. Electric, Vancouver and committee chairman; standing, Gerry Mann, B. C. Electric; Edith Rauch, Puget Sound Power & Light Co., Seattle, and Marguerite Sablin, of Harper-Meggee Co. Inc., Seattle, Bendix distributor

Rural and Farm

Rural and Farm Bureau sessions dug deep into the roots of the region's agricultural economy. Ralph Gram, B. C. Electric, conducted the round-table sessions. Speakers the first two days on land use and ground water included D. Sutherland, director, land utilization & research, Department of Lands, British Columbia; Prof. T. L. Coulthard, department of agricultural engineering, University of B. C.; Dr. D. G. Laird, department of agronomy, University of B. C.; J. S. Kendrick, chief hydraulic engineer, Water Rights Branch, Victoria. Dr. Frank Noakes, department of electrical engineering, U. of B. C., told an interesting account of using electrical resistivity measurements as a means of locating and assessing ground water resources, something that came as an outgrowth of testing for pole line grounds. Newell Dickson, Western Washington Experiment Station, Puyallup, spoke on planting of flat pea to make grazing land of logged off areas and protect reforestation.

Electrical farm questions came up on the Wednesday session. Ray E. Foss, Wade-Rain Mfg. Co., Portland, told of the increasing use of sprinkler irrigation, even for grain crops and corn. There seems to be no crop that cannot be more economically irrigated, from a water standpoint, with sprinklers. J. A. MacCarthy of B. C. Electric had a paper on fan ventilation of farms for moisture control.

L. N. Roberson, engineer of Seattle who has specialized in panel heating, described methods for controlling both heat and humidity in greenhouses. With electric soil heating cable there is also need for moisture control and many plants are sensitive to small differences in humidity. With thermostats and ventilator controls and sprays the desired conditions can be maintained.

J. H. Taylor, customer service manager, B. C. Electric, spoke of the long-range interest of the utility in the prosperity of agriculture that goes beyond the mere utilization equipment. The session ended with a round-table discussion of the place of adequate wiring in farm electrification, led by A. G. Mayer, Washington Water Power Co.

Manufacturer, Wholesaler, Dealer, Contractor Bureau

The question of employee discounts to utility employees was still unanswered at the end of a full afternoon of discussion of it at the Manufacturer, Wholesaler, Dealer, Contractor Bureau, presided over by Dean Pulsifer, Westinghouse Electric Supply Co., Seattle. No prepared papers were given; it was a free-for-all discussion. And it was frank.

Utilities which no longer merchandise can no longer sell appliances to their employees from stock, yet several sales managers said they felt the use of electric appliances by such employees

was responsible for greater public acceptance. Should utilities consider offers from manufacturers to permit their employees a discount on appliances, or from dealers? D. B. Leonard, Pacific Power & Light, said such discounts could come under the heading of advertising and sales promotion. Most stores give such discounts to their own employees. He did not feel that purchasing agents of companies should be used to cut out the dealer. W. L. Thrailkill, after reciting difficulties in setting up a fair policy, said that perhaps if the utility felt it good for the business it should share in the discount with the dealer. R. B. Lane, electrical contractor, Seattle, asked if contractors' employees also were not entitled to discounts. Howard Emerson reminded that, despite abstract theories on the subject, the industry faced uncontrolled discounts from brokerage and discount houses.

Need for sales training was talked over the second day. It was felt that training was needed both on basic selling and on products. Where should it originate? Consensus seemed to be that the utility was best suited to conduct the basic training, distributors the product training. But basic training needed active follow-through by dealer contact men of the utility to see that it was used; by distributor salesmen on product. Wherever there exists an association or league, it was felt the sales training would come better through its auspices.

Commercial and Industrial Bureau

Commercial and Industrial Sales Bureau, headed by K. E. Hollingsworth, Puget Sound Power & Light Co., was in the predicament of not having any spare kilowatts to sell, an irony that a little skit, written by Carl Hoffman, Washington Water Power Co., and enacted by Ernest Hatch and Lorris Winn, depicted. (This will appear later.) The group, however, took a look at the progress made by its competitor, LP gas. A survey, made among six Northwest power companies, was reported upon by A. S. Gilbert, Idaho Power Co. It indicated a growing awareness of competition and some companies taking steps to combat it. LP gas prices seem on the increase, are unregulated, and some recent explosions have slowed down public acceptance. However, lack of equipment to sell is slowing electric activity.

Electronic food cooking, despite its spectacular publicity, has made little headway, D. O. Bergey reported through R. E. Sinclair, Pacific Power & Light. Further study of it was recommended. Commercial water heating possibilities were surveyed by E. Tysoe, B. C. Electric, who detailed what each of the companies were doing, what their rates are, their peak limiting, if any, and, in one case, a means of making quick estimates for customers. It was recommended that a standard method of making such estimates be developed.

Lighting was on the second day's agenda, with R. G. Scott, B. C. Electric, as chairman. Blair Ploughman, Washington Water Power, after surveying the companies to find their degree of participation in the Planned Lighting program reported all giving lighting plan service but few in the program itself. He urged that utilities protect their lighting loads by guidance to customers in their installations. Another phase was mentioned by A. B. Couch, who deplored the curtailing of lighting activity by utilities because it was from them that training and experience was gained by young recruits to lighting, training that they carried into other branches of the industry. Power factor control was also discussed briefly. Walter Potter, G-E Lamp department engineer, Portland, reviewed the spectacular history of the fluorescent lamp, since its introduction ten years ago.

The last session heard from Ladner Ross how best to use the Research Advisory Service; from Berkeley Snow who urged action on the data sheet program; and it discussed power-factor correction problems.

Although but the annual conference of one section of the association, both in program and attendance it had the proportions of a full-scale convention. Entertainment by the electrical industry of Victoria, its Electric Club and B. C. Electric Co. was distinctive and exemplary.

● ACTIVITIES of the general sales division of the B. C. Electric Railway Co. will in future be centered at the former B. C. Motor Transportation Bldg. at Seymour and Dunsmuir Sts., Vancouver, B. C. For a considerable number of years sales operations of the B. C. Electric were directed from the head office building and from the former Granville St. store. With the retirement of the company from the actual merchandising field, the Granville St. building has been disposed of and dealer development, industrial development, research advisory service, home service operations and similar activities will all be carried on from the Seymour and Dunsmuir building, which has been entirely remodeled.

● ADVANCEMENT of a number of men in the sales department of Schick Inc., manufacturers of Schick electric shavers and shaverests, has been announced by Kenneth C. Gifford, president of the company. BILL GUMZ, supervisor of the San Francisco territory, has been promoted to central district manager with headquarters in Chicago. TONY BRINKS, supervisor of the Seattle territory, will take over the San Francisco territory. PAUL BREEN, service supervisor in Seattle, has been advanced to Brink's post as sales supervisor for the Seattle area.

● R. B. MCPHERSON and G. BOYER have announced their partnership in the business of Reliance Electric, Vancouver, B. C.

A promise fulfilled: The fathers of Bill Schedler and Matt Connelly Jr., put their sign in a walnut grove near Lafayette, Calif., when the two boys were Jap hunting in the Pacific with the Navy. Now the Appliance Center is built and operating successfully. The store has its own ample parking space with flood lights operating at night

Training

More than 500 salesmen for adequate wiring in and around Pueblo, Colo., will be promoting it when the program already started by E. R. Pemberton, sales manager, Southern Colorado Power Co., is finished. Starting with the Local No. 12 of IBEW, Pemberton has held two meetings for 35 electricians and enlisted their support. Contractors and then builders and general contractors and architects, and finally financing agencies, will all be given the story in turn.

Sales training is also under way for appliance dealer salesmen. The EEI-NEWA basic course has been started in two daytime courses, from 8:30 to 10:30 a.m. on alternate days, so that half a store's sales force can come one day, the other half the next day. There are eight lessons in the basic course, with four on appliances to follow. Another four on rural electrification selling will be given later.

The courses started in Pueblo, says Pemberton, but will be taken to Rocky Ford and Canon City for night meetings. Much larger response than was anticipated has come forth. Some 40 signed up in Pueblo. The Larry Wray book is used as text. Pemberton acts as instructor. The program ties in with the Go All-Electric drive in the Rocky Mountain region.

Repair bench at California Electric Service Stations in San Francisco. Garth Chamblin, left, and Truman Ball, Proctor rep., watch repair man reassemble iron

Cartoonist Hoyt shows Indian reaction to electric blanket in recent issue of Thomas and Betts, "More Juice" booklet

"Yeh, it's nice—but it ties you down"

Bladefoot Indian chief seems interested in an electric Indian blanket as Montana dealer tells him all about controls

Garth
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Rocky

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ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

June 1948 ©

Trends

The appliance business felt a couple of the tremors that may be forerunners of many more earthquakes in the next few months. Radio business was pretty spotty, with big stores gobbling up liquidations to offer as specials. Small dealers, unable to buy the closeouts, were hitting the standard lines better. Price cuts began to appear in flocks.

Chill

Angling for another wage increase the CIO electrical unions put the slowdown on still short refrigerators where it would hurt most, causing one manufacturer to close the line down. Reefers had been rolling fine up to then. With possibility of steel allocations to divert materials to Europe the prospect for full supply this fall doesn't look too good. One maker even sent warning to distributors that a recent price drop might have to be withdrawn if wages were hiked again.

Wet

Washers, wringer type, have been slow, so have cleaners—selling that is. Price resistance is being felt. Automatics have been taking the cream of the business, but wringer types are out of reach of the low income group.

Boom!

The combination of a sudden price cut and a new line of models right after loading its dealers gave Bendix a bad drop in dealer prestige. Also upset some distributorships considerably. Recent customers of dealers came in complaining of buying before the price drop to add to their woes. Not a very smooth job of gliding to earth.

Acquired

Another big washer manufacturer steps into dishwashers, which should prove they have arrived. Apex-Rotarex has just bought Dishmatic, the dishwasher with the auxiliary hot water tank. It will have its production models of automatic washer, a new dryer and a midget washer to show at the August market, says Lou Stull.

Big sales show

Back with a million dollar sales show again, Frigidaire toured the country last month, performing in Los Angeles, Salt Lake City, San Francisco, Portland, Seattle, Spokane and Billings. One of five crews, led by W. I. Buchanan, Western Division manager, had as actors C. R. Birkholm, sales promotion manager, Oakland district; W. J. Michelson, sales promotion manager, Salt Lake City; and W. Stromme, sales promotion manager, Seattle. Showed three new lines of refrigerators, new ranges, home laundry equipment, air conditioning, commercial refrigeration equipment. Dramatized the necessity to abandon ideas of easy sales and return to door-to-door selling.

Drop

Silex announced a price drop on its 8-cup coffee maker from $10.24 to

Westinghouse's service class series was delayed a bit by factory changes, but got under way late in May, starting at Santa Rosa, and in other parts of the West simultaneously, according to Jim Brown. — Now on

E. F. Perkins, who retired as a full colonel from the Transportation Corps recently, and once was electric appliance sales manager for Pacific Gas and Electric, later Los Angeles manager for Hesix, has joined C. A. Russell Co. as electric heating specialist. He was chairman of the PCEA committee that prepared the original electric air heating manual. — Returns

Lloyd Sutton, at Western Merchandise Mart, has taken on Nevada and northern California agency for Colonial life-sized television projectors, which throw a 7x9-ft. image on a screen. For large installation, the projector lists at $2,195, F.O.B. New York. — Big video

Deepfreeze has put distribution of its home freezers through Montgomery Ward stores in addition to its other franchised dealers. Country dealers protest that it gives them nothing exclusive to sell against the chains which get so big a chunk of the farmer business anyway. — Cross fire

Frank Edwards Co., San Francisco distributor of automotive supplies, paints and Thermador and Deepfreeze had a disastrous fire that completly leveled its Van Ness Ave. offices and warehouse. Is conducting its business just the same with deliveries from factories. Its Deepfreeze stock, fortunately was in another warehouse. Thermador ships from the Los Angeles plant. — Fire loss

O. B. Wilt, long time with G-E, and lately with L. H. Bennett Co., has opened offices as a manufacturers representative in the Western Merchandise Mart. Handles Press-to-Magic toaster, Wastemaster disposal, Scott Newcomb fans and Hot-Roc water heaters. — Change

When Edward F. Hale dropped its appliance lines Dalco took over the distribution in northern California of Presteline ranges and water heaters, and Amana home freezers and refrigerators. Added Garth Hite to its staff too as sales promotion manager. — Picked up

J. A. Warren, Jr., formerly at the Chicago office of Kelvinator, has joined the Kelvinator staff at Oakland as zone manager, succeeding F. B. Posthuma, who resigned, according to C. J. Bachman, Western regional manager. — New man

A company in Los Angeles will soon peddle pancake batter along with milk. Good chance there for waffle iron and pancake griddle promotion tie-ins. — Flap Jacks

Portable television sets to take to the beaches were predicted within the next ten years by Mark Woods, American Broadcasting Co. — Or vice versa

By December or January San Francisco bay region should have two television stations on the air. Three now have construction permits, one owned by the San Francisco Chronicle, one by KGO, one by Associated Broadcasters owners of KSFO. Don Lee is battling for a channel previously applied for. Six others are fighting before the FCC for the other two channels. Meanwhile a group of young aspirants to jobs in television have formed a club called "Television-San Francisco," are conducting a "workshop." — S. F. video

Too early yet to predict what two Supreme Court decisions in the cement and steel conduit industry may do to national prices in appliance lines. Ruling was that the delivered price system was illegal, freight absorption is out, zone prices are out, and delivered prices plus freight likely. — Watch this

Changes at L. J. Meyberg Co., Bendix, Norge, RCA distributor, in its San Francisco office. Bill Lancaster, there for 18 years, lately as sales manager, and R. C. Christensen, Bendix manager, both resigned. Herb Atwater was named Bendix manager instead. James M. Scales, sales promotion manager, was advanced to general sales manager. Ken Ross was made manager of the electronics department as Richard Wagner became manager of the American Central Kitchen department. — More changes

First major range and water heater campaign in Southern California Edison territory since the war is being launched with dealer meetings, sparked by Edison and distributor men, in all key cities. "Electric Living is Out in Front," is its slogan. Details will be reported next month. — First drive

Hotpoint announces that John E. Dugan, well-known commercial electric cooking specialist, formerly with Montana Power and later Puget Sound Power & Light, will be the commercial cooking representative for it in the Northwest, with headquarters in Portland. — Jack's back

B. C. Electric Co. has simplified its extension policy to the extreme. Customers are required only to guarantee the use of a minimum of $2 worth of electricity per month for a four-year contract and the company will run a line to serve them. Only in extreme cases will the old footage rule be applied. — Made easy

A show was held in Sacramento last month. The Sacramento Home Exposition, May 8-11 was a big success. Efforts are now being made to make the electrical exhibits at the California State Fair in September outstanding. — State Fair

Fourth quarterly cost ratio study of the Inland Empire Electrical Dealers Assn. for 1947 showed cost of goods declining, gross profit rising, overhead expense down a little, net profit holding at 10% and selling expense on the rise. — Cost ratio

Third annual Construction Industries Home and Building Exposition is due in Los Angeles June 10-20 at Pan Pacific Auditorium. Another model home will be given away. — Soon

Associated Pot & Kettle Clubs have just brought forth the 1948 National Housewares Directory, largest yet. Arthur Hitt was directory chairman, Olive MacDonald and Osgood Murdock were its editors. Sells for $6, and is obtainable at Western Merchandise Mart, 1355 Market St., San Francisco. — New Directory

Big publicity tie-in will be made all over the country when the movie, "Mr. Blanding Builds a Dream Home." A Blanding Dream Home is being built in Portland by Portland Home Builders Assn. G-E, Rheem and others who have equipment in it will also give it a big play. — Dreams

Fred J. Stone at the Western Merchandise Mart, San Francisco, is featuring a display of handpainted Colonial lamps produced by Lightmakers Inc. of New York. — Lamp leader

"Onward Thru Change" will be the theme of the Summer Market at the Western Merchandise Mart, San Francisco, August 2-7. — Theme

Schuyler-Wilson Co., San Francisco, are now distributors for Stewart-Warner radio in northern California with seven field men and radio specialist T. N. Biglieri covering the field. . . New home economist for the company is Henriette Peck, formerly with Cory in the East, who is devoting her time to the development of Knapp-Monarch appliance sales through retail outlets. — Additions

Refrigeration Discount Corp., Nash-Kelvinator finance subsidiary, is offering Kelvinator and Leonard appliance dealers an exclusive personal group life insurance plan. — Protection

Miss Dorothy J. Holland is the new Laundromat demonstration supervisor for Westinghouse Electric Supply Co., northern California district, replacing Mrs. Letty Werner. — Takes over

There will be no price reduction on Hamilton Dryers in the near future, says H. G. Evans, vice-president in charge of sales, Hamilton Manufacturing Co., Two Rivers, Wisconsin, pointing out that the company has maintained its present prices for 17 months, despite material cost increases and labor cost increases. — No drop on dryers

"At Home Week" featuring showings of toys and juevenile goods, was held June 6-11 at the Western Merchandise Mart, San Francisco. — Toy show

McCormack & Co. at the Western Merchandise Mart, San Francisco, is now distributing the Vornadofan air circulator line. — New line

McCall's Magazine reports a heavy demand for two of its market surveys on postwar retailing problems in the radio and appliance fields. Titled Appliance Retailing Two Years After the War and Radio and Television Retailing Two Years After the War, both surveys are available on request. — In demand

Landers, Frary & Clark is building a spring campaign around its new Universal Bantam Range. Promotional efforts will be directed toward building bigger range profits in small range sales for its distributors and dealers. — In action

Small electric water heater that also serves as an electric stove is being produced by Fowler Manufacturing Co., Portland, Ore. Dual purpose heater is 28 inches high and a foot square. Heat is emitted through an adjustable register in the top. — Double duty

Hoover is offering its new electric iron exclusively to dealers carrying other Hoover products. — Select group

Handy appliance and reminder timer for the home is the new Time Aid produced by Paragon Electric Co. Built-in switch automatically shuts off radios, sun lamps, heating pads and other household appliances after preselected time. — No worries

"Ironing Can Be Easy" according to Proctor's new ironing manual which gives a step-by-step description of the whole process--with short cuts and improved methods. Ironing story is also told in Proctor's 20-minute sound film which gives demonstration of the new sit-down ironing method. — A cinch

ELECTRICAL WEST

Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © JUNE, 1948

Replace With Electric

DID you realize that there is such a good market for you among the present users of electric ranges? To say nothing of the many homes that have been wired for electric ranges, but because of their scarcity, have had to use other fuels? The original owner sold the house and took the electric range with him.

So, despite the shortage of transformers or slowness of lines to reach completely new customers, or even power shortages, there is still a good market for all electrical dealers among the **present users.**

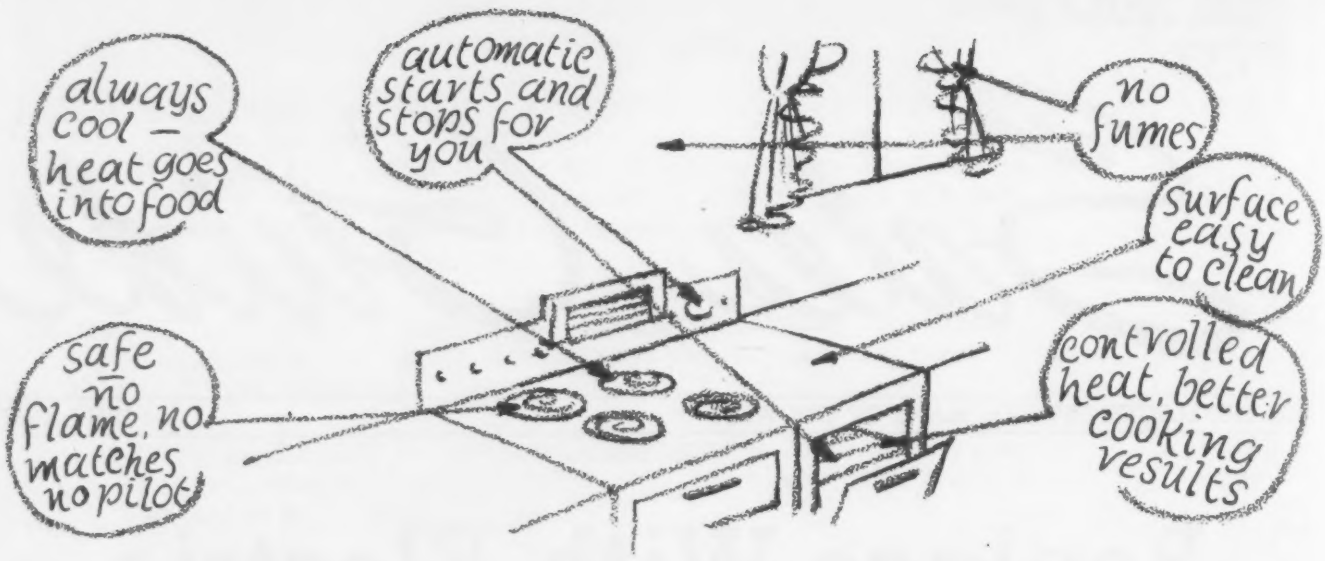
Do you realize that it is **only now** that all truly **new postwar ranges** have begun to appear? There was nothing to excite the possessor of a prewar range to want to buy a new one when those that have appeared up to now have been prewar models. Now, all makes have brought forth shiny new models with postwar features and refinements. They are even more efficient than before. They use less electricity. Their sale actually aids the present stringency.

Realize too that this market has no high wiring cost obstacle to overcome. The house is already wired for range. It is a replacement only. In the case of the house already wired but using other means of cooking, the wiring is there as well.

In a great many cases the present range user can be sold an electric water heater to supplement the range. This adds to your opportunity for sales. With range wiring in, it adds but comparatively little to wire in the water heater.

Replacement selling requires a return to some of the good old basic selling methods. But with a difference. Users do not need to be sold the value of electric cooking itself. They know that from personal experience. What they want is a new range, a better one, a more modern one. For this type of selling the **product** story from the manufacturer is more important to stress than the basic electric cookery appeal. That appeal should **still** be used with the new prospect who has never cooked electrically.

On the next page both types of sales appeals are listed for your use. Build your selling presentation, your advertising, your displays around them.


always cool — heat goes into food
automatic starts and stops for you
no fumes
surface easy to clean
safe no flame, no matches no pilot
controlled heat, better cooking results

Ranges Have New Sales Appeals

for present users—

Better Looking—New styling by the best industrial designers give smarter appearance.

Faster—Newly designed heating elements give quicker heat and apply it better to pans.

More Control—More degrees of heat from barely warm to quick, fast heat, always accurately.

Greater Accuracy of oven heat controls for consistently successful baking, etc.

Money Saving — Better design reduces amounts of electricity required for all cooking.

Easier to Keep Clean than ever, with rounded corners and other design improvements, better burner and reflector design, better materials.

Even Safer than before because of location of controls, better insulation to enable installation close to walls or built-in, interior wiring safeguards.

More Conveniences — such as pressure cookers, roasters, warming ovens, pot and pan storage, oven lights, surface lights, choice of arrangement of top elements or burners, well cooker units that can be used at the surface too, pilot and tell-tale lights, minute-minders and timers, convenience outlets on timer control, special broiler designs, special grease traps, and several others. This gives a wide choice of features.

Such are the NEW appeals for old users. In the next column are the basic appeals.

for new prospects—

Clean — The electric way of cooking is clean, it means clean pots and pans, without soot or smudge burnt on them, clean kitchen walls and ceiling, clean draperies, because no fumes deposit on them or on silverware or other metal surfaces. The electric range itself is so easy to keep clean and shining. The air is always clean.

Healthful—Produces better tasting, better digesting, better looking food. Preserves the delicate vitamins by controlled heat, retains minerals and juices, flavors and moisture. Keeps the air healthful and clean. Healthier for plants.

Cool—Summer cooking is pleasant with the well-insulated electric range that applies its heat economically to its task, doesn't waste it to the surrounding air.

Safe—With complete peace of mind you can leave it to cook while you are away or at other tasks. Even children can operate it safely. If turned on by small youngsters it can do no harm. It needs no vents or chimney, does not alter the air by combustion. Range can be placed in the center of a room or against any wall.

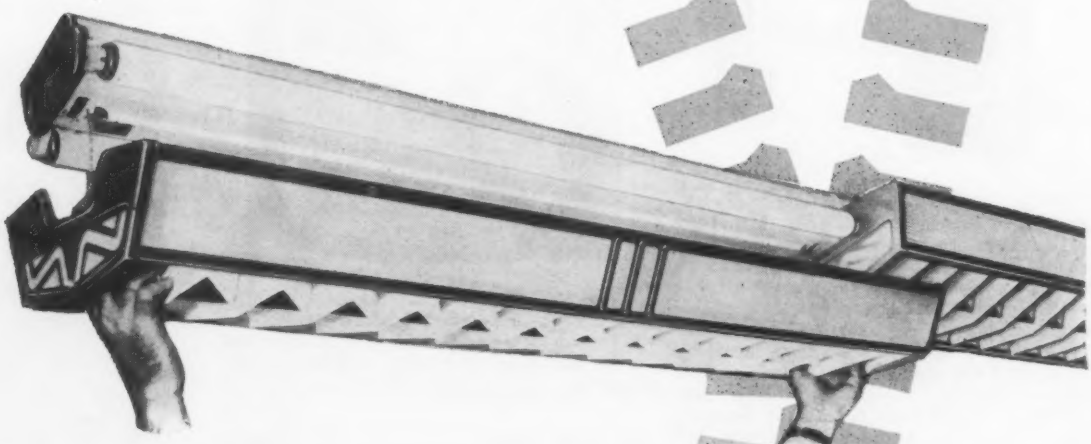
Accurate and Automatic—Cooks with identical results, heat under absolute control. Automatic timer starts, watches and stops cooking. Releases time for other things.

Modern and Attractive—Most modern of all. Others imitate but cannot match it—it is **matchless** in all ways. **Speedy, economical** and **long lasting.**

ENGINEERED FOR QUICK SERVICING

as easy as a zipper

No tools—no fumbling with screws or nuts:
No troublesome hinges.



ZIP! **Press two spring clips and the enclosure drops down, securely held by service chains. Both hands are free for relamping or cleaning.**

ZIP! **It takes only two seconds to snap the enclosure back firmly in place. A lot of minutes . . . and money . . . saved!**

And that's only one of many little features engineered into the Viz-Aid that make maintenance easy, economical. May we send Bulletin 10-B-3 with complete details?

the **VIZ-AID**

For ceiling or suspension mounting . . . unit or continuous installation. Designed for two 40-watt and two 100-watt lamps. U. S. Patent Nos. D-138990, D-143641, and 2411952.

999

IT'S EASY TO SEE WHEN IT'S

DAY-BRITE *Lighting*

DAY-BRITE LIGHTING, INC., 5412 Bulwer Avenue, St. Louis 7, Mo.
Nationally distributed through leading electrical supply houses.

In Canada:
address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ontario.

APPLIANCE PREVIEW

Range (635)

Norge Model E-457 has fully automatic controls, safety switch, divided top, large center oven, two vertical utensil compartments. The Minit-Master reminder times intervals of from 1 to 60 minutes. A selector switch may be set for automatic temperature and time control of oven, deep-well cooker or appliance outlet. Tele-switch markings help select any one of seven surface cooking speeds. Oven has observation window, non-tilt racks. A 350-watt element in warming drawer keeps dishes and food at 140°F. The standard Model E-427 has standard automatic controls and many of the advantages of the deluxe E-457.

Cleaner (636)

Royal has a tank-type vacuum cleaner with new type swivel floor nozzle, air-tight connections on hose and tools, two-section wand, curved to go under low furniture, sweep action floating brush, dust and germ filter, newly developed finger touch clamps for removal of end bell, simplified dust receptacle, with 190 sq. in. of filtering surface.

Water Heating Element (637)

Electro-Therm's Thermalink electric water heating element has a built-in thermostat, an adjustable temperature dial, built-in safety control to protect against overheating and burnout. The element may be set for any temperature between 120° and 180° F and will maintain temperature of water within plus-minus 10°F, the announcement states. Underwriters' approved. Wattage rating: 600, 750, 1,000, 1,250, 1,500, 2,000, 2,500 and 3,000.

Portable Washer (638)

The Roy Chef portable electric washing machine is offered by Poulsen & Norden Inc. It consists of a lower drum compartment and a top motor unit and cover; will take a 4-lb. load.

Nursery Lamp (639)

Hungerford Plastics Corp. has added a Mother Goose model to its Lazy-Lite line. Like the adult model, this juvenile lamp is turned off and on by tilting the translucent plastic shade. A 7-watt bulb is contained in each end of the lamp. The lamp comes in pink and blue, with Mother Goose figures molded into the plastic shade. A Lullaby model includes a Swiss musical movement that plays *Rock-A-Bye Baby*.

Floor Fan (640)

Robbins & Myers Breeze-All floor fan is a 12-in. 115-volt fan with 2-speed motor (1,465 and 1,320); operates on 60 cycles a-c. It is housed in a mottled-mahogany plastic, with chrome-plated zinc die-cast legs and steel ring-type grille. In laboratory tests, the unit supported up to 750 lb., it is stated. The motor is mounted on rubber cushions and enclosed in the inverted cone-shaped column, which provides a natural baffle to direct floor-level air upward and outward from the fan blades.

Coffee Maker (641)

Homecraft Products Co. is making a coffee maker which brews French-drip coffee electrically. Cold water passes through a jet thermostatic heating element, then through the coffee into a server. Coffee is brewed at 180° and remains at that heat while current is on.

Combination Unit (642)

The Fowler Jiffy Twin is a combination water and air heater for use in small quarters. This dual-purpose unit has a 5-gal. water capacity; three-way insulation; adjustable register to control warm air. It is 28 in. high, 12 in. wide, weighs 40 lb., is available in 750- or 1,250-watt models.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

635 636 637 638 639 640 641 642

Name..... Company*..... Title*.....

Address.....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Put This Plank In Your Platform!

Resolved—that we will participate increasingly in our Association activities to help solve mutual industrial problems.

This is election year. As voters we will determine the kind of administration for the next four years. To do our part as citizens we must go to the polls and cast our ballots.

Similarly, as members of the fast-growing electrical industry we have the responsibility of keeping it strong and vigorous. We must plan for the future—as our industry's growth is limited only by our own vision and determination.

Your Association now has 2716 members, real evidence of the growing realization that we can best cast our vote of confidence in the future of the electrical industry, by joining and working together in Association activities.

PACIFIC COAST ELECTRICAL ASSOCIATION, INC.

601 WEST FIFTH STREET
LOS ANGELES 13, CALIFORNIA

447 SUTTER STREET
SAN FRANCISCO 8, CALIFORNIA

THE MONTH IN BRIEF

Wheeling Demand Made By Government

Pacific Gas and Electric Co. was asked to supply energy to federal agencies on an exchange basis for power received from federal plants, in a complaint filed last month with the California PUC by the Justice Department. The wheeling order is not authorized by federal or state laws and would be contrary to the federal reclamation law, according to PG and E officials, who saw the demand as another attempt by USBR to force the company to convey power to customers the bureau hopes to take away from the company. PG and E has been buying the power output of Shasta Dam since June 1944 and of the Yosemite plant since November 1928, under contracts which do not include such a conveying clause. The Justice Department said that proceedings against the company were initiated at the request of Interior Secretary Krug, the Departments of Army, Navy and Air Force and the National Advisory Committee for Aeronautics.

Los Angeles Files on Kings River

Los Angeles Department of Water & Power has asked for reinstatement of its hydroelectric power filings on the Kings River in central California. Originally made in 1926, the application covers six power drops with a combined capacity of 250,000 kw. The department has spent $100,000 for surveys and engineering, and expects to pay $100,000,000 for plants and transmission line. Generation of the same amount of energy in steam plants would require about 2,750,000 barrels of oil annually, it is stated. Samuel B. Morris, department manager, said that no water rights are involved in the project and that there is no conflict with irrigation interests. On the contrary, he said, the six reservoirs will have a combined capacity of 162,000 acre-ft., and will benefit irrigation in the San Joaquin Valley.

Arizona Power Situation Better

Arizona has curtailed plans for a state-wide brownout following a pledge of additional power from Hoover and Parker dams. Made possible through unanticipated runoff from the Rockies, the additional power will amount to from 20,000 to 30,000 kw. Following the announcement, it was decided to revise curtailment to include Pinal County farmers and a limitation on Phoenix office building cooling to 85°.

Merger Report Promised for July

An engineering report on proposed merger of Puget Sound Power & Light Co. and Seattle City Light will not be available until late in July, it was announced following a meeting of Seattle's Mayor Devin with Ford-Bacon-Davis Co. and Carl D. Pollock, who are making the study. City Light and western Washington PUD representatives have agreed to discuss and report on technical matters relating to the proposal, including division of facilities between City Light and the districts, which propose to buy the company's properties outside the Seattle competitive area. Both groups would like to have the White River, Snoqualmie and Rock Island plants of the company, and PUDs are seeking legal opinion as to their rights to sell power to City Light.

Municipal Proposal Defeated

Recent voting at Cortez, Colo., resulted in defeat of a municipal power plant ownership proposal by a seven-ballot margin. A total of 465 ballots was cast as climax to a heated campaign, with 229 declaring for the project and 236 against. A second ballot, which proposed a $225,000 bond issue to purchase the Empire Electric Assn. plant, a cooperative, and other necessary equipment, failed with 225 for, and 239 against.

PUD Takes Over

Puget Sound Light & Power Co. properties in Mason County, Wash., have been sold to the Mason County Public Utility District for $200,000. Announcement of the purchase was made by T. W. Webb, head of the Mason County PUD. Negotiations with two other southwest Washington counties are continuing, with Pacific and Grays Harbor PUDs reported preparing offers for Puget Power's facilities in those counties.

Ruling Brings More Kilowatts

Washington Water Power Co. will be able to produce about 25,000 kw. additional during normal years, as a result of FPC authorization to draw up to 1,100 sec. ft. more water from Lake Chelan. According to company officials, between 15,000 and 20,000 kw. probably will be used and the rest will be placed in the Northwest Power Pool. Lake Chelan was being held at El. 1,096 ft. and the company was permitted to draw 1,000 sec. ft., about half capacity. Under the new ruling, the company may take up to 2,100 sec. ft. after April 1, when the lake level is above 1,096 ft.

B. C. Taxing Capital Equipment

Machinery and other new capital equipment installed in industrial plants in British Columbia will be subject to a new 3% retail sales tax ratified by the provincial legislature. Raw materials, or supplies used for processing of goods for eventual sale in the retail market, will be exempt from the new tax. Also exempt are coal, coke and fuel oil taxed under the Fuel Oil Tax Act, and gasoline, subject to a provincial tax. Tax proceeds will go for social security costs and municipal aid. The province hopes to raise $12,000,000 annually from the tax.

PUD Planning Hydro Plant

Snohomish County PUD, Everett, Wash., has asked FPC approval of a $10,000,000 development in the Snoqualmie National Forest for domestic water and power. Plans call for a 310-ft. concrete dam on the Sultan River, about 20 miles east of Everett; a 230,000 acre-ft. reservoir; a five-mile tunnel and a power house with 60,000 kw. capacity.

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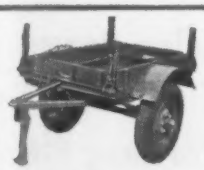
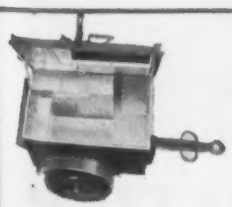
Model 1775 Pole Trailer
Lightweight, all-steel pole dinkey excellent for transporting poles over short or long distances. Especially adapted for high speed hauling, easy to handle, ideal for emergency calls and for light construction work. Wide tread avoids shaking or whipping at high speeds.

Model 1485-A Pole Dinkey
Ideal for high speed hauling and rugged service. Has tubular tongue and axle to insure the greatest strength with a minimum of weight. Rear bunk balances trailer. Permits easier handling when empty.

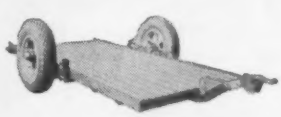


Combination Cargo and Pole Trailer P8T Series.
Available in load capacities of 3100 to 8200 lbs. Extension tongue permits hauling of poles up to 40 feet. Optional electric brakes, side boards, stanchions, etc.

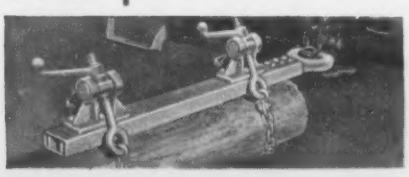
Model 2064 Pole Trailer
All steel, heavy duty unit for use with trucks of 1½ tons capacity or larger. All welded frame carries two stationary bolsters with sliding uprights, to facilitate the proper placing of large or small loads.



Cable Splicer's Cart — Model S
All steel construction — compact — rugged — theft proof. Compartments for every tool. Folding support leg. Capacity 1,000 lbs. Underslung spring construction, effects a low center of gravity, reduces sluing and skidding at high speeds.



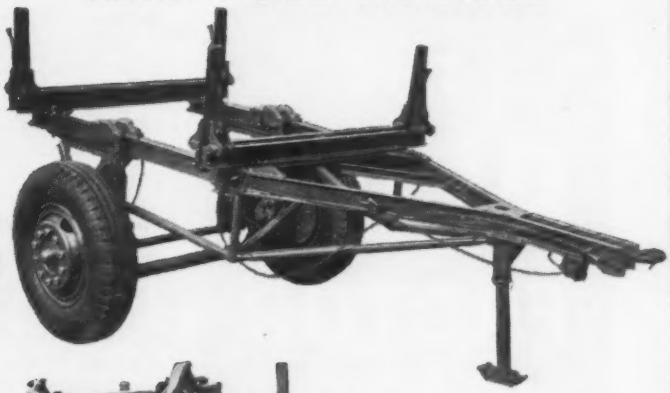
LO-BED Trailer
Easier to load and safer to handle this all-purpose LO-BED Trailer has an unlimited range of usefulness making it a profitable investment. Optional equipment includes stock racks of wood construction, securely bolted; and an all-steel hand winch, with 2 speeds 4 to 1 and 24 to 1.

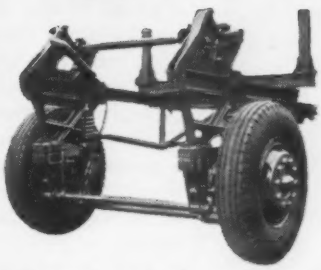


HEAVY DUTY DRAWBAR "H"

For use with 3 and 5-ton pole trailers. Has coupling eyes to fit standard pintle or towing hooks. It is 30" in length and 3" wide. Tighteners are 18" apart. Number 3120 steel channel. Complete unit weighs 55 pounds.

COMBINATION CABLE REEL AND POLE TRAILER





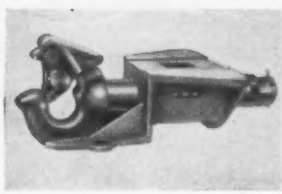
This combination Cable Reel and Pole Trailer can be quickly converted into a pole trailer as shown above by simply removing the cable reel saddles and installing a pole carrying bolster, an operation requiring about 15 minutes with simple hand tools.

Shown here is the rear view of PCP trailer showing cable reel saddles and reel spindle in place for cable reel service. It handles reels from 34" to 38" or from 44" to 48" width. The design has been improved to provide greater strength throughout. The practical advantage of the dual purpose construction is to provide low initial and operation cost, low depreciation, and the need for only one license to operate.

Distributed by GraybaR Electric Company

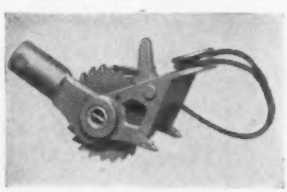
1417 PINTLE HOOK

Designed especially for heavier duty and built to handle the most severe hauling jobs. Hook is one-piece drop forging made of heat treated alloy steel. Positive lock type latch. Only seven bolts required to install the hook on the truck.



"BU" PINTLE HOOK

In addition to a positive lock, this hook has a large cast steel bracket for mounting under the rear cross member of the truck frame. The bracket is slotted to provide a strong mounting and prevent it from turning off center. It is shockproof.



SURE BINDER

A safe, efficient tool for securely binding logs, poles, or bulky loads. Compactly designed, simple to operate. Built with one-piece steel base, operates on winch and ratchet principle. Weight 18½ lbs. complete.

FWD TRUCKS

UTILITY SUPPLY DIVISION

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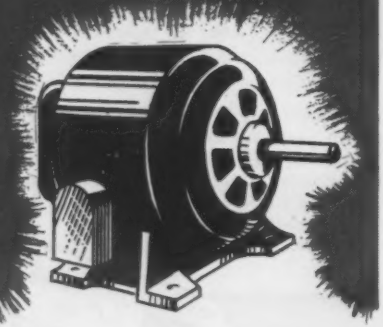

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BRUSH!

A motor is just as efficient as its brushes. Often an excellent motor is put into operation equipped with brushes selected for general use. However, atmospheric conditions, temperature and overloading impede efficiency and performance. Our engineers will gladly make the proper recommendations to increase motor efficiency with the use of the proper brushes. Look to "Ohio" for good performance in the Motor and Generator Brush Field.

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THIS MONTH'S NEWS

Alternate Plans Offered on Rogue River Development

A public hearing on two alternative plans for development of the water resources of the Rogue River basin in southwestern Oregon was to be held in Medford, Ore., on June 8, Regional Director of the Reclamation Bureau R. J. Newell announced.

The two plans, called A and B, have a general physical similarity, the most significant difference being in the amount and location of storage reservoirs.

Plan A, which calls for power generation of 96,250 kw., would cost $89,824,700 at 1947 price levels. Plan B, for 68,450 kw., would cost $83,903,200.

Plan A involves nine storage dams, with aggregate capacity of 517,900 acre-ft. and six power dams, eight dams to be built on tributaries of the Rogue and seven on the main stream. The storage dam farthest downstream on the main Rogue would be at Lewis Creek. Plan B calls for 11 storage dams, capacity 353,400 acre-ft., and five power dams, seven on the main stem and nine on the tributaries, with the lowest on the Rogue at Lost Creek.

Both plans would provide for the same irrigation development. Plan A is believed by the Oregon State Game Commission and the U. S. Fish and Wildlife Service to cause the greater damage to salmon and steelhead runs, although both would have adverse effects.

Substantial flood control benefits, both along the Rogue River and Bear Creek would be provided by Plan A, but the alternate plan would give virtually no control along the Rogue River.

● A 60,000-VOLT line between Miles City and Forsyth, Mont., will go under construction in July, the Montana-Dakota Utilities Co. announced. The 44-mile line will double capacity at the two cities. It will tie in with a line to be built by the Bureau of Reclamation between Glendive and Miles City. Both lines will be supplied with power from Fort Peck Dam.

● DIRECTORS of the Sacramento, Calif., Municipal Utility District have awarded contracts for five 2,000-kva. unit substations in 1949 and 1950 at a cost of $141,914. Units will be furnished by General Electric Co. and Westinghouse Electric Corp.

ALL KINDS
of SMALL
TRANSFORMERS

—in the JEFFRIES line

Practically all your small transformer needs are supplied by the Complete Jeffries line. We have specialized for years in providing transformer to exactly match your requirements. If not in our regular line, we build to meet your specifications in a hurry!

Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

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1710 E. 57th St. Los Angeles 11, Calif.

EXTRA Holding Power
QUICKLY Installed
TOUGH For long life

EVERSTICK
ANCHORS

For new construction and maintenance — Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resiliant, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

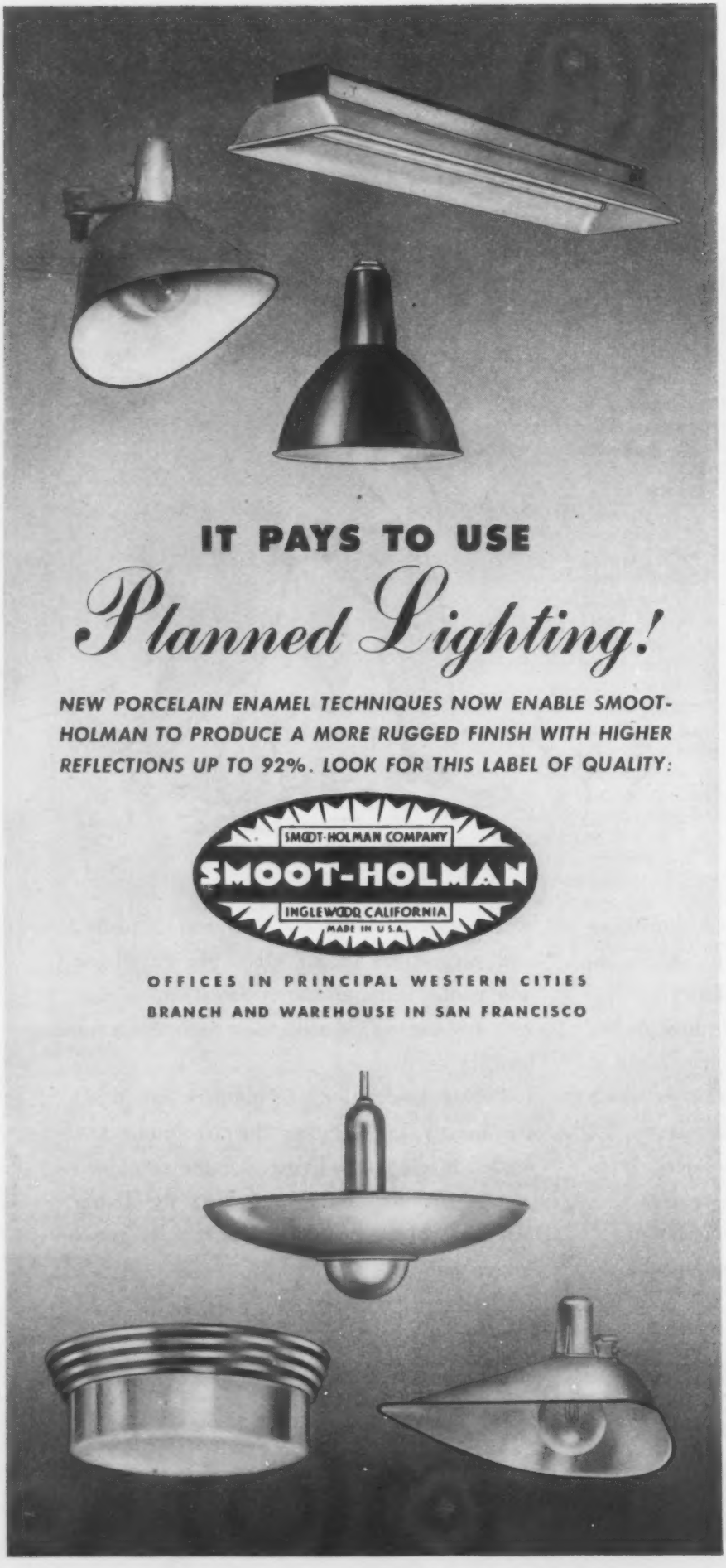
. . . the continental champion in providing the highest standard of electric service to homes, farms, business and industry.

This leadership was reached through the medium of the Northwest Electric Light & Power Association, an organization in which all segments of the electrical industry . . . utilities, manufacturers, wholesalers, contractors, service companies and dealers . . . take an active part. Sales promotion plans, service ideas, engineering developments, research assistance to business and industry, and suggestions of all kinds are channeled and pooled through the Association, so that industry and public alike may profit from the benefits derived.

In this Association, the industry has found the means for keeping the Northwest the leader in electrical living and the combined genius for constantly improving the living standards of the people in this rapidly growing region.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

OFFICES 204 CORBETT BUILDING • PORTLAND, OREGON


IT PAYS TO USE
Planned Lighting!
NEW PORCELAIN ENAMEL TECHNIQUES NOW ENABLE SMOOT-HOLMAN TO PRODUCE A MORE RUGGED FINISH WITH HIGHER REFLECTIONS UP TO 92%. LOOK FOR THIS LABEL OF QUALITY:
SMOOT-HOLMAN COMPANY
SMOOT-HOLMAN
INGLEWOOD CALIFORNIA
MADE IN U.S.A.
OFFICES IN PRINCIPAL WESTERN CITIES
BRANCH AND WAREHOUSE IN SAN FRANCISCO

PRIEST RAPIDS DAM OPPOSED AT HEARING

Proposed construction of a $270,000,000 power dam across the Columbia River at Priest Rapids in eastern Washington, drew objections from fisheries and transportation interests at a public hearing conducted in Wenatchee, Wash., by Col. L. H. Hewitt, Seattle district engineer for the Corps of Engineers.

The Washington State Department of Fisheries complained that the dam would cause a loss of 10 to 15% of the present total Columbia River fisheries, or an annual value of $2,500,000. Donald McKaren, representing the Oregon Fish Commission, pointed out the difficulties of providing fish runs over the 150-ft.-high structure. Mitchell Hanavan, representing the Federal Fish and Wildlife service, declared that the dam would have a profound effect on fish life and objected there is no assurance that adequate provision can be made to prevent depletion of fish and wildlife in the area.

W. P. Stapleton, representing the Northern Pacific Railway, objected to including navigation locks in the dam, declaring there is no economic justification for them since the area already is more than adequately served by rail and highway transportation.

Statements in support of the dam came from the Columbia Basin Commission, chambers of commerce and public and private power interests.

Plans call for a multi-purpose dam 12,000 ft. long, 200 ft. high from foundations to top. The power house would have 23 units of 54,000 kw. each with a name-plate capacity of 1,242,000 kw. Site of the proposed dam is located near the northwest corner of the Atomic Energy Commission project, 56 miles below the Rock Island Dam of the Puget Sound Power & Light Co., to which it will back up slack water. The dam would form a pool of 3,000 acres and require some railroad and highway relocation.

● R. E. REDDEN, hydraulic engineer, has been appointed to study the feasibility of establishing hydroelectric plants in Washington, Iron and Kane counties, Utah. The Rural Electrification Assn. has been asked to aid the survey which was authorized by the State Water and Power Board on the plea from southern Utah power users.

● APPROVAL of a $1,500,000 stock issue to finance improvements and extensions for the Tucson Gas, Electric Light and Power Co., Tucson, Ariz., has been granted by the Arizona Corporation Commission. Much of the amount will go toward financing the company's new 11,500-kw. generator.

I've had *Another* busy year!

I connected over 10,000 electric customers during 1947 . . . and that's no small job . . . for it was necessary to construct many miles of new lines to make those connections.

The material and manpower situation is much improved. We now have 17 company and 20 private contractor line crews building new lines and improving and expanding our present distribution system . . . approximately three times the prewar force.

You'll still have to wait for service after you make application if line construction is required; but the wait won't be nearly as long as it would have been a year ago. Our back-log of unconnected applications has dropped from 5,000 a year ago to 3,700 at present.

Yes, electric service is easier to get . . . and it's *still* worth waiting for . . . for it brings you the many electrical helpers that make life well worth living.

REDDY KILOWATT.

SAN DIEGO GAS & ELECTRIC COMPANY°

This ad was run for the information of our large number of rural customers, many of whom have had to wait for service.

BARKER DAM IMPOUNDS WATER AGAIN

Public Service Co. of Colorado's Barker Dam, near Nederland, on Boulder Creek, is again impounding water for power generation purposes after a $1,225,000 rehabilitation job that started April 15, 1946, and involved unique engineering techniques.

Built in 1910, Barker Dam had been so badly ravaged by freeze-thaw cycles and ice action on the upstream face that repairs or rebuilding became mandatory. Prof. Raymond E. Davis, University of California faculty member, acted as consultant. With L. B. Card, power company engineer, he worked out a novel procedure to remedy and strengthen the structure.

Five major steps were required: (1) the upstream exposure was chipped and sandblasted to solid concrete; (2) some 6,000 holes, each 3 ft. deep, were drilled and one-inch diameter steel rods were cemented in; (3) foundation rock was grouted, a drainage system installed and footings poured; (4) 1,909 precast slabs, each weighing 4½ tons and measuring approximately 12x6½ ft., were attached to the dam by means of the projecting steel rods; (5) space between dams and slabs was filled with aggregate which was congealed by pumping a thin cementing solution through it.

Pontoons floating on the surface of the water were used for part of the operations. Sandblasting, drilling and anchor rod work were effected from scaffolding suspended from the top of the dam.

Completion of the job increased thickness of the dam by 8 ft. at the bottom and 2½ ft. at the top.

Barker Dam impounds 11,500 acre ft. of water when full; is 120 ft. thick at base, 170 ft. high and is 720 ft. wide from bank to bank of the creek at the top.

Get the BIG THREE of Motor Performance with MULTIFLEX BRUSHES

U. S. Pat. 2,181,076

1. IMPROVED COMMUTATION
2. MORE UNIFORM WEAR
3. LOWER OPERATING COSTS

When you install Helwig-Speer MULTIFLEX Brushes on your rotating equipment, you're taking advantage of advanced engineering. For MULTIFLEX Brushes give you uninterrupted, better contact . . . reduced vibration . . . lower circulating current . . . even wear.

The result: *superior performance at lower cost.*

And you also get all the advantages of double brushes with single-brush simplicity . . . without special adapters or changes in equipment. MULTIFLEX brushes slide right into conventional single-brush holders. Catalog 25 gives you all the facts on ordering brushes. Write for your copy today.

★ CALL YOUR NEAREST OFFICE

A handy way to stock brushes

— There's a Helwig Brush Kit for every purpose. For example, Kit No. 10 contains brushes, springs and wicks for 175 types of vacuum cleaners. You don't have to order a complete kit if you run low on a popular brush. Simply consult Bulletin 65 and request the number you need from the Helwig office nearest you.

PACIFIC COAST OFFICES
San Francisco.....Pier 3, Exbrook 2-8820
Seattle.....166 Jackson St.; Elliot 7133
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Denver.....1644 Blake St.; Cherry 4425
Salt Lake City.....524 F. St.; Tel: 3-1600

HELWIG SPEER

HELWIG CO., CARBON PRODUCTS
Makers of Multiflex and Transert Brushes

Idaho Power Company Starts Dam Construction on Snake

Preliminary construction is under way for Idaho Power Co.'s new hydroelectric power plant six miles west of Bliss on the Snake River. Morrison-Knudsen Co., Boise, Ida., is the contractor.

The Bliss plant will have a capacity of 70,000 kw. Entire installation will cost approximately $11,500,000.

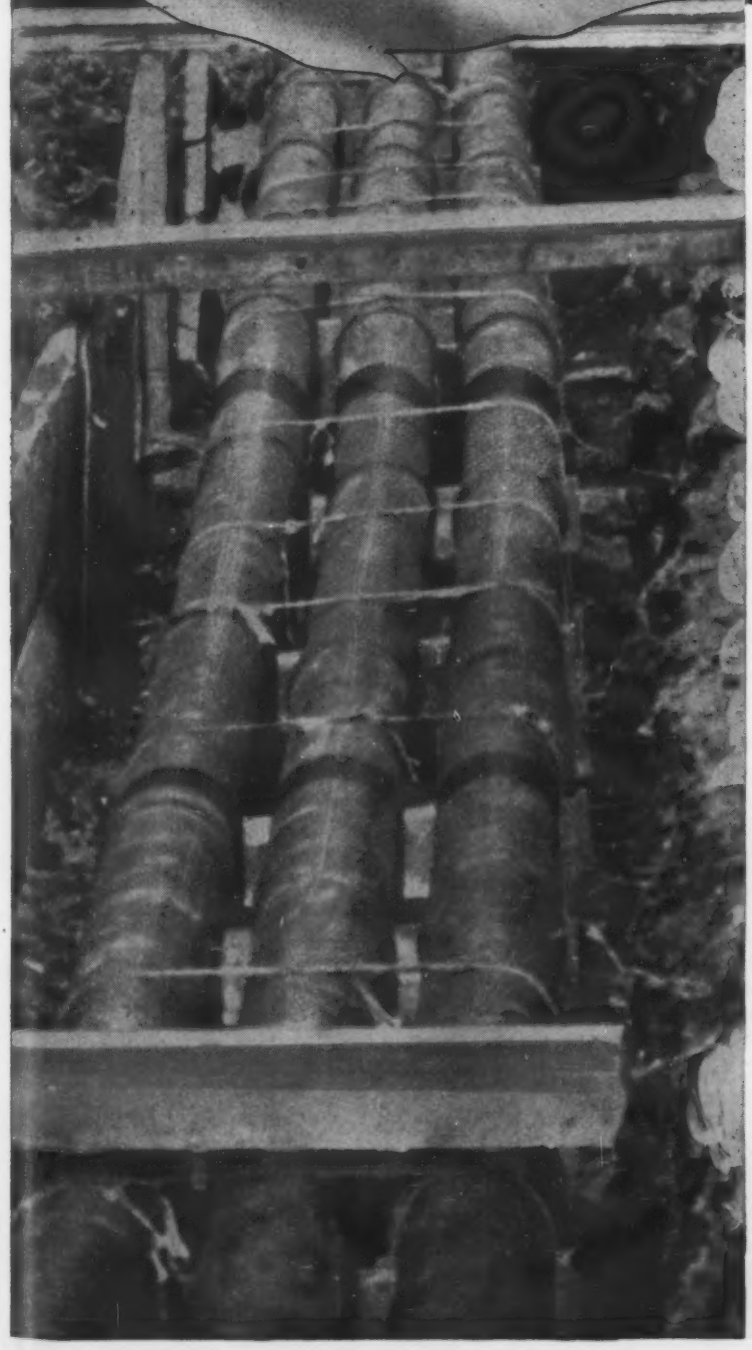
Crews have built a road into the river canyon to point of construction, a coffer dam has been completed and the construction camp is near completion.

Initial construction phase will be a 95-ft.-high dam, extending 600 ft. to form a reservoir about five miles long. Three generating units, the first scheduled for installation in November 1949, will comprise the plant. The other two generators will be installed approximately two months apart with the entire project slated for completion the early part of 1950.

To be completed in 1949 is a $3,000,000 transmission line of 230,000-volt capacity to connect Boise and American Falls. The entire Idaho Power Co. area in southern Idaho and eastern Oregon will benefit by the installation.

● CONSTRUCTED at a cost of $5,000,000, a new electrically operated railroad line between the Bigham, Utah, mines of Kennecott Copper Corp. and the Magna-Arthur mills, went into operation May 1. It replaces the old Bingham & Garfield Railway, whose steam Malleys had been carrying ore since the mines and mills were started. The new line was two years in construction. It has lower grades and flatter curves, making it possible to haul 70 100-ton ore cars instead of the old 50-car load on the B & G. Electric locomotives on the new line are of 3,300 hp.

A Tip From The Underground...



Here is the tip-off to all who are interested in the long-term performance of power and communication cables.

ORANGEBURG FIBRE CONDUIT when inspected after 50 years underground proved itself to be as serviceable as on the day it was first installed.

When you install ORANGEBURG FIBRE CONDUIT you protect cables from 1. Cable Sheath Abrasion. 2. Pulling Tensions. 3. Corrosion. 4. Cable Movement. This protection is permanent and all-embracing.

ORANGEBURG is light in weight, easy to handle, transport, install . . . a product of low initial cost and low maintenance . . . a product that resists corrosive ground waters and chemical wastes permanently.

The Electrical Industry has used ORANGEBURG FIBRE CONDUIT for over 50 years as the ideal protection of cables.

The informative ORANGEBURG Catalog No. 49 is yours for the asking. Write today! Keep it for ready reference in your files.

Technical Bulletin A. C. 48 is also available. It explains the use of 5° Angle Couplings with short lengths in place of special long radius bends.

Orangeburg Manufacturing Co., Inc.
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Orangeburg Standard—For installation with concrete encasement.

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Distributors—GRAYBAR ELECTRIC CO., INC.
GENERAL ELECTRIC SUPPLY CORP.

THE MAGNOTRONIC FLUORESCENT STARTER

PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COST Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures. Guaranteed for one year. Write for descriptive literature.

The (SP-15-20) for use with either 15 or 20 watt lamps
The (SP-30-40) for use with either 30 or 40 watt lamps
The (SP-100) for use with 100 watt lamps

Ask for descriptive literature

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Hi-Strength
GROUND ROD CLAMP
3 Big Features!
Truly High Strength! Body and set screw are made of DURONZE III—50% stronger than other alloys. Hence, clamp will not distort—will stay tight.
A Heavy Clamp in the Lowest Price Range.
Pressure Bar Aligns Wire with rod and distributes pressure of set screw over a greater length of wire, making a very low resistance connection.
For better performance specify
BLACKBURN
Hi-Strength Ground Rod Clamps
REA APPROVED
BUILDERS OF QUALITY PRODUCTS FOR 15 YEARS
JASPER BLACKBURN PRODUCTS CORP.
FIRST, MADISON & CLINTON STS. • ST. LOUIS 6, MISSOURI

BPA WILL START SEVEN POWER PROJECTS

Upon receiving word that President Truman had signed the deficiency appropriation bill, Paul J. Raver, Bonneville Power administrator, announced that work will start at once on seven northwestern emergency power projects.

Appropriations provided in the bill make possible construction of high-voltage transmission facilities to keep pace with new power generating installations at Grand Coulee Dam and will accelerate power services at the Hanford Works.

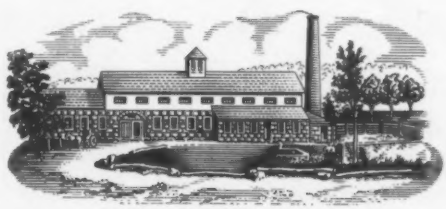
Of the $2,140,000 appropriation provided in the bill, $525,000 is in new funds for construction; $140,000 for operation and maintenance, and 1,475,000 for contract authorization. Projects included in the program are:

Foster Creek—Snohomish line No. 2, to serve the Puget Sound area; Grand Coulee—Columbia No. 3; Holcomb—Neselle line and substation, to meet requirements in Wahkiakum and Pacific counties, Wash.; Forest Grove and McMinnville line and McMinnville substation, to serve Willamette Valley points in Oregon; Troutdale substation transmission line No. 3, to serve the Portland area and to relieve a bank now at Troutdale for use at Longview, Wash.; Midway-Benton line and Midway line terminal, to serve the Hanford - Richland - Walla Walla area in Washington; Midway subway transformer exchange.

● FPC has issued a 1947 revision of *Principal Electric Utility Generating Stations and Transmission Lines in the United States.* Comprising eleven regional maps and six supplementary sheets, the series shows, in general, transmission lines of 22 kv. and above, electric utility generating stations of 1,000 kw. and above and industrial electric generating stations of 1,000 kw. and above when interconnected with an electric utility. The eleven regions shown in the series are the New England, Middle Atlantic, Southeastern, East Central, Upper Great Lakes, Ozark and Panhandle, Western Gulf, Southwest Mountain, Northwest Central, Pacific Northwest, and Pacific Southwest. The six supplementary sheets show details of the following congested areas: Boston, New York and Philadelphia, New Jersey, Rhode Island and cities in the Southeastern and Pacific Southwest areas. The maps are sold exclusively by the Federal Power Commission, Washington, D. C. The complete set of eleven with supplementary sheets is $2.50. Individual maps are 25c each. The order number for the set is FPC-M-8.

Time

Time is the measure of all things. Few of man's inventions can stand its merciless judgment. Yet Kerite for over 90 years has thrived and spread and gained renown. Time, indeed, gives Kerite its unqualified recommendation.



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HYDEE HANGER*

the economical way to hang chain suspended fixtures

Saves time and money on new or "change-over" jobs: Self-grounding ...you can use 2-wire cord and plug. Fits standard 4" or 3¼" outlet box or plaster ring. **Complete** with receptacle, two 5-foot chains, spring wire "S" hooks and cord clips.

$1.65 LIST

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Nationally distributed through leading electrical supply houses.
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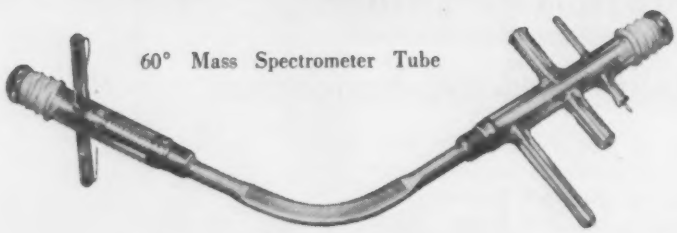
012

IT'S EASY TO SEE WHEN IT'S DAY-BRITE Lighting

*Patent No. D-141024 and No. 440914
Underwriters approved.

URANIUM U-235 detector employs NICHROME* V exclusively



60° Mass Spectrometer Tube

The Mass Spectrometer, which has played vital roles in the discovery of U-235 and its subsequent applications in the fields of atomic energy and cancer research, is one of the most important and critical of measuring instruments.

Metal used in the Ionization Source and Collector System must be:

(a) non-magnetic (i. e. remain unmagnetized in the presence of the powerful magnet used in the Mass Spectrometer);
(b) able to withstand temperatures of about 665°F. in a vacuum of 10^{-7} mm. mercury without deformation;
(c) non-porous, and non-absorbent of gases;
(d) easily machined, drilled, tapped, threaded, welded.
(e) available in wire, sheet and rod forms.

"Of all available metals" states Process & Instruments, Inc., of Brooklyn, N. Y., makers of Mass Spectrometers, "Nichrome V most satisfactorily meets all these requirements."

If you have particularly exacting specifications to meet, consult with us. The fruits of our 48 years of specialized experience are at your disposal.

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*T. M. Reg. U. S. Pat. Off.

WATER USERS APPROVE STEAM UNIT AT TEMPE

Installation of a 7,500-kw. steam generator at the Tempe, Ariz., plant of the Salt River Valley Water Users Assn. has been approved by the board of governors who voted $750,000 for the project.

O. L. Norman, general manager, said the unit would be built by General Electric and would not require additional boilers since the present steam plant is adequate. Delivery is scheduled for February and the plant is to be in operation by April.

Decision to add the generator was spurred by critical shortages this year and a tremendous growth in consumer demand. Because of low reservoirs, the association's ability to generate hydroelectric power has been severely curtailed and steam and diesel generators have been pushed to capacity.

In recommending purchase of the generator, Norman told directors that, even with completion of Davis Dam, the power shortage in the Southwest is expected to be 300,000 kw. by 1952, and the association can expect little outside help.

Approval of the purchase was the second major step taken within a week by the association under direction of Richard D. Searles, newly elected president, who earlier had proposed a plan for purchasing irrigation water from private well owners.

The association has offered private pumpers $3.50 an acre-ft. for all water released to the association, guaranteed unlimited power for pump operation, and agreed to assume all costs of pump maintenance.

The water thus obtained would supplement the two acre-ft. allotment pledged to shareholders, but which the association is doubtful it can deliver from its stored supplies.

Loveland, Colo. to Buy Power from Federal Plant

The Loveland, Colo., city council has approved a contract for the purchase of electric power from the Colorado-Big Thompson project, to become effective when energy becomes available, presumably early in 1950.

The agreement, which extends through June 30, 1958, provides for delivery of from 500 to 1,500 kw. at the initial date, and an additional 4,000 kw. when the project reaches capacity operation.

Loveland will continue to operate its municipally owned hydroelectric plant and will maintain its diesel plant for stand-by purposes.

5,000,000 Youngsters Need Our Help Now

THE bumper wartime crop of babies, about 5,000,000 larger than the population experts expected, is reaching school age.

At school these youngsters should find a good education awaiting them. That is their most cherished American birthright.

But unless something is done quickly, millions of these children will be cheated. They will crowd into classrooms already run on double shifts. They will move in with children who are now sitting two in a single seat. They will read germ-loaded books mangled by a generation of use by grimy hands.

I

So the continuing crisis in American education is given a new twist by unexpected pressure on school plant and equipment.

The U. S. birthrate has jumped by leaps and bounds. Instead of declining in the '40s, as the experts expected it would, the rate climbed from 17.9 per thousand in 1940 to 21.5 in 1943. It jumped to 25.9 in 1947, an increase of 45 percent since 1940. Result—by 1956 elementary school attendance in the United States is expected to jump from 18,200,000 to more than 23,400,000, an increase of about 5,200,000, or more than one-fourth.

The rush has already begun. It will pick up speed next fall.

Now, while this pressure has been building up, our public schools and their equipment have been running down—first through inevitable wartime neglect, then because inflation and material and labor shortages made it difficult to catch up.

If we are to give this bumper crop of youngsters the break they deserve—and reach the educational standards the nation needs—we must speedily do a major job of educational rehabilitation and expansion.

II

Some headway has been made in overcoming the teachers' salary crisis.

Teachers' salaries are improving. Pay problems were driving good teachers away from their posts in droves not long ago. But in the year since the 57th editorial in this series emphasized that crisis, the average teacher's annual salary has increased about $300—from $2250 to $2550.

True, increases vary enormously from state to state and from town to town. In a few states the average increase has been $500; in some less than $100. But, for the nation as a whole, last year's increase put teachers about even in the race with the cost of living. After taxes, their salaries have risen 68%, and the cost of living 67%, since 1939. In terms of pay increases, however, they are not nearly as well off as are industrial workers, whose average weekly wages after taxes have risen 108% since 1939. They are far behind farmers, whose net income is now four times what it was in 1939. And teachers had notoriously low salaries to start with.

A great deal more needs to be done in raising salary standards to put our school system on a firm footing. There are still about 100,000 teachers, nearly 12% of all public school teachers, who hold temporary or emergency credentials. They cannot meet

prevailing standards, and not very severe standards at that, for persons holding their posts.

The salary crisis, however, is easing.

III

But now comes the new crisis in school buildings and equipment.

We would have been hard put to get our schools back into shape after years of wartime neglect—even without a booming birthrate complicating the problem. Right now, 85% of all public school buildings need major remodeling to remove health and safety hazards.

And we aren't building enough new schools to keep up with current needs, to say nothing of catching up on those we were not able to build during the war years. School construction expenditures for 1948 are estimated at $375 million – which is less than what was spent in 1939. With building costs twice as high as they were in 1939, that means we aren't even holding our own—we are falling further behind.

And now comes the rush of war babies.

IV

We must spend at least $11 billion on new schools and equipment in the next decade.

Public and elementary schools must have $6.6 billion. Equally important, another $4.4 billion must be invested in buildings and equipment in our private schools, colleges and universities if they are to meet the demands which will be made upon them. The private school and the privately endowed university are doing their full share and doing it well. The need for them is increasing.

These figures cover only rockbottom needs for educational plant and equipment. But statistics are a very restricted recorder of this crisis.

You can see it better, I'm sure, in schools not very far from your home. There are schools with leaking roofs and outdoor toilets in our greatest cities. There are schools where students still use histories and geographies copyrighted before 1920—books with no mention of World War I, the depression of the 1930's, the Russian Revolution or the rise of the dictators. There are countless schools where modern methods of visual education are completely unknown.

All of these conditions promise to get worse – promptly – as that scheduled 5 million increase in the school population gets rolling.

V

The Metropolitan Life Insurance Company does not indulge in lurid prose. It says after painstaking study of the educational crisis that:

"Unless definite measures are taken immediately . . . large numbers of American boys and girls will be deprived of an adequate education."

Currently we are deeply concerned about our military defenses. We are taking, and I think rightly, emergency measures to strengthen them. But we must regard our schools as a part of our national defense as vital as are our armed forces. This is particularly true in these times of fifth columns and ideological warfare.

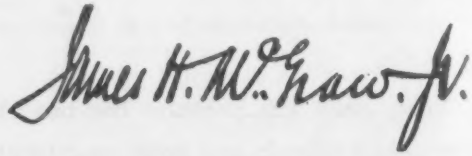
If we are wise, we will raise our sights. We will give the continuing crisis in education the same urgent attention being given the more obvious but no more real crisis in national defense.

Go to the school house in your neighborhood and discover what needs to be done to provide for the rising tide of young Americans. Ask your school board and your school administrators and teachers how you can help them.

That is good citizenship.

That is patriotism.

That is our duty to the oncoming generation.

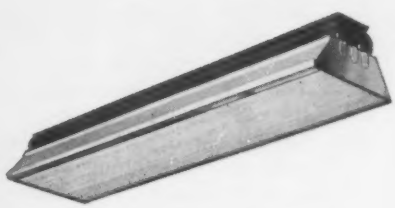


President, McGraw-Hill Publishing Company, Inc.

Smithcraft TROFFERS

THE RESULT OF RESEARCH BEHIND THE CEILING LINE!

Years of experience in the lighting field — years of working closely with the men who actually install lighting fixtures — have given Smithcraft engineers a thorough insight into installation and maintenance problems. This combined experience plus exhaustive research has resulted in the *exclusive* features found only in Smithcraft Troffers, features that mean direct savings in installation and maintenance time and cost.

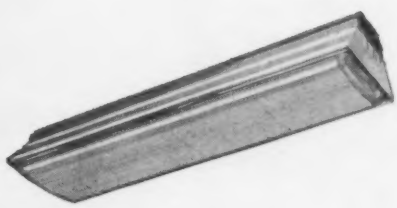


ALIGNER HANGER* . . . requires no exact positioning for installation . . . housing snaps on with no loose fastening devices . . . allows lateral adjustment of troffer to fit requirements of ceiling . . . permits up and down elevation of troffer *before or after installation has been completed.*

DUO-CAM HANGER* . . . the simplest yet most effective louver hinging and fastening device ever developed . . . hinges or releases louver at either side by simple finger-tip pressure . . . permits complete removal of louver at will.

REFLECTORS . . . fasten into position without loose parts . . . top reflector removable *at any time* for access to ballasts and wiring.

LOUVER . . . introduces 40° cut-off both lengthwise and crosswise . . . provides even light distribution with low brightness.



CONSTRUCTION . . . electrolytic zinc-coated Bonderized steel for trouble-free lifetime service . . . troffer is exactly 12" wide to fit requirements of san-acoustic ceilings and permit maximum light output.

VERSATILITY . . . troffer can be installed in *any* type of ceiling . . . if required, ceiling panels can be supported by framing attached to troffer.

GLASS TROFFERS . . . glass is locked securely in metal envelope without clips or fastenings . . . frame hinges and snaps closed easily.

For ease of installation and maintenance, for beauty of appearance, there is no equal to the Smithcraft Troffer.

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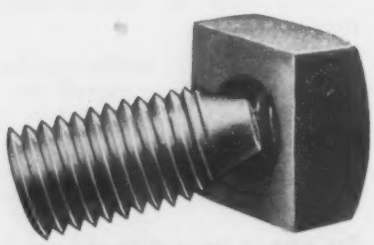
High Tensile Bolt Guy Clamps

Cross Arm Braces

"HANDIDRIVE" Pole Steps

Manufactured and Stocked For Your Convenience On The Pacific Coast



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BPA, PUD, PP&L SIGN THREE-WAY AGREEMENT

Under an agreement between the Bonneville Power Administration, the Clark County (Wash.) PUD and Pacific Power & Light Co., Bonneville power will be transmitted over the district's lines for delivery to Pacific lines at Camas, Wash. From Camas, Pacific will transmit energy to Oregon over its Columbia River crossing.

Bonneville power for Pacific Power & Light will be fed into the PUD system north of Vancouver and will be transmitted over the Vancouver-Camas 66,000-volt line to the interconnection at Camas.

The agreement provides that Bonneville will bill the PUD for power it now buys from the Pacific company at four substations, formerly owned by the private company. It is estimated that the PUD will deliver 10,000 kw. to Pacific Power & Light in return for 5,000 delivered to the four PUD substations by the company.

The arrangement will eliminate the necessity for building PUD transmission lines to the four substations. It also will permit the district to obtain power from the private utility at Bonneville rates.

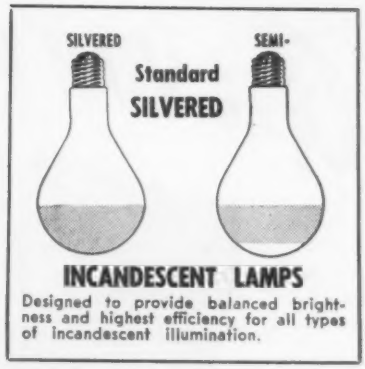
● NORTH SACRAMENTO, Calif., has relighted a 5,600-ft. stretch of Del Paso Blvd., with 66 20,000-lumen mercury vapor lamps, spaced 170 ft. apart on each side of the street in staggered arrangement. Light centers are 33 ft. above the road and 4 ft. out from each curb. The former installation consisted of 13 posts with 2,500-lumen incandescent lamps, mounted 22 ft. above the roadway and placed only at intersections.

● IN A 15-STATE TABULATION of fatal night accidents, those on unlighted streets represent 78% of the total. Figures for Colorado show 58 fatal on lighted streets and 118 on non-lighted streets; for Oregon 64 on lighted and 135 on non-lighted; Utah 41 on lighted and 51 on non-lighted; Washington 8 on lighted and 178 on non-lighted.

● DENVER now has 1,550 mercury 16,000-lumen street lighting units installed and 1,200 on order. It is also experimenting with 15 20,000-lumen lamps. These have been installed by Public Service Co. of Colorado to determine whether the higher-lumen-output lamps will prove satisfactory.

● STERLING, COLO., recently installed 23 16,000-lumen lamps and there are orders for 26 in Brush, with four sodium lamps at intersections.

incandescent *integrated lighting...by* fluorescent



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Designed to provide balanced brightness and highest efficiency for all types of incandescent illumination.

210 PL:
Luminous indirect lighting. The Silvray line encompasses a large variety of designs to satisfy commercial, residential or industrial applications.

Silvray for PLANNED LIGHTING

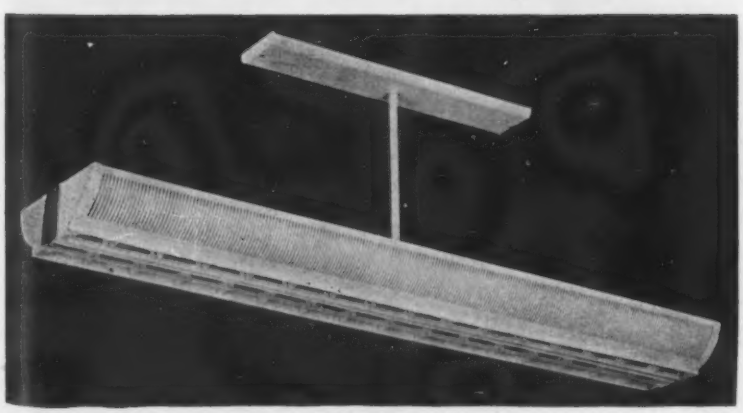
The Silvray principle of Integrated Lighting, either incandescent or fluorescent, provides every essential of good light distribution in the following three classifications . . .

Light for Seeing—embraces the applications for such visual tasks as are usually found in offices, schools, hospitals, etc., wherein eye comfort for sustained periods is important.

Light for Selling—includes those applications wherein illumination is used to create eye-appeal in the merchandising of goods—where high brightness contrasts are deemed preferable in order that merchandise be "accented".

Light for Homes—to provide every room in the house with comfortable, eye-saving, soft illumination, free of glare and perfect for every home use.

THE 1500 LINE:
Combines simplicity with modern styling and offers a wide flexibility in applications. With the Silvered Bowl Lamp, it provides totally indirect illumination; with the Semi-Silvered Bowl Lamp, provides Light for Selling applications.



THE NEW 711 LINE:
Designed for good lighting. All Silvray Luminaires have incorporated numerous "plus" features which assure fine illumination. High light output and distribution are combined with the Silvray method of Brightness Modification — designed to inexpensively provide brightness limitations in varying degrees.

All Silvray Fixtures are covered by U. S. Basic and Design Patents

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Get 3 Times The Fuse Service

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Tamper-proof protection . . . Non-interchangeable link . . . Safe time-lag . . . Link support . . . Life-time outer parts . . . Guaranteed results.

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Save current . . . Reduce premature fuse blowings . . . Prevent burnt fuses and clips . . . Stop unnecessary shut-downs . . . Reduce fire and accident hazards.

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Used for slot liners, coil wrappers, phase, core, end and splice insulation. Available in sheets 36"x36", thickness from .006" to .025".

Fiber Glass-Mica comprises Fiber Glass Cloth and Mica splittings, bonded with a Flexible Plastic organic resinous binder. It supplements the standard Flexible Mica and Paper or Mica and Cloth products by using a fibrous inorganic glass cloth in place of the organic paper or cloth components, thus extending the usefulness of the insulation to considerably higher temperatures of operation.

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BONNEVILLE SALES TO B. C. ELECTRIC WILL END

Bonneville Power Administration has advised B. C. Electric that the sale of Bonneville power to British Columbia will end next year, and that by that time they expect to get Canadian power in return for that which has been supplied from United States sources.

B. C. officials stated last month that the decision will cause no power shortage in Vancouver since there is sufficient power available. When the first units of the Bridge River hydroelectric development are placed in operation in October there will be ample reserve power.

Vancouver last year used 290,000 hp. of electrical energy with a part of this supplied from BPA. When the B. C. Electric completes its Bridge River development it will be able to provide 600,000 hp., in addition to present facilities.

Old D-C Generator Taken Off Line at Spokane

Washington Water Power Co. recently took off the line at Spokane the last of four 600-volt direct-current generators.

The first direct-current generators were placed in use in 1889 to serve the city's trolley cars. When current became required for elevators, it was obtained from the trolley car system because the electric lines carrying power for lighting purposes were not heavy enough for the elevator loads.

The street cars went out of service in the 1930s, but elevators still required 600-volt direct current until the last such elevator was converted to alternating current last month.

Elimination of the generators is the first step toward eventual discontinuance of all direct-current service in Spokane. About a dozen downtown buildings now are using 240-volt direct-current power for lighting and other purposes.

● CLOSING THE BOOKS on the last attempt of Whatcom County, Wash., to collect taxes amounting to $323,257.62 from dams, power houses, and other light and power property of the City of Seattle, the case of the City of Seattle vs Whatcom County has been dropped. Whatcom County Superior Court Judge Ralph O. Olson dismissed it on motion of A. C. Van Soelen, Seattle Corporation Counsel. The suit, filed in March 1936, to prevent the county treasurer from claiming the light company's properties, never went into a courtroom.

UNION PACIFIC

The Governor of California *invites You*

State of California
GOVERNOR'S OFFICE
SACRAMENTO

EARL WARREN
GOVERNOR

To American Industry:

In California we are currently celebrating the centennial anniversaries of the beginnings of our State. We gain much inspiration from our review of the progress which has been made in the comparatively short span of one hundred years.

During the past eight and one-half years alone California's population has increased by 47 per cent and our industry and agriculture have risen to positions of great importance in the economic life of the nation.

Our tremendous reserves of natural resources and our strategic world trade position on the shores of the Pacific Basin assure California's continued progress in the years to come.

I am happy, therefore, to join in inviting you to investigate the opportunities for expansion which exist in the many communities of our State.

Sincerely,

Governor

Earl Warren

* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

*Address Industrial Department, Union Pacific Railroad
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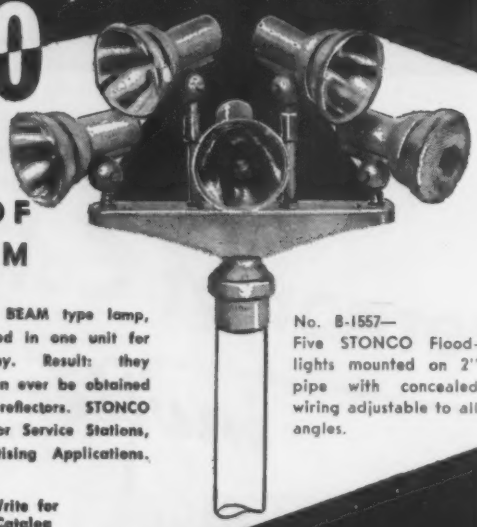
Road of the Daily Streamliners

THEY GIVE *More Light* FOR THE MONEY!

STONCO *Floodlights*

WEATHER PROOF
CAST ALUMINUM



STONCO Floodlights use the SEALED BEAM type lamp, in which beam and light are combined in one unit for greater lighting efficiency and economy. Result: they give more light or less current than can ever be obtained from lamps using the wasteful open-type reflectors. STONCO Floodlights are preferred everywhere for Service Stations, Sports Arenas, Industrial and Advertising Applications.

No. B-1557—
Five STONCO Floodlights mounted on 2" pipe with concealed wiring adjustable to all angles.

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Sold Exclusively Through Wholesalers— Prompt Deliveries—

No. B-142—
STONCO Floodlight can be used anywhere, can be mounted on a 3" or 4" outlet box. Adjustable to any angle.

STONE MANUFACTURING COMPANY
489 Henry Street, Elizabeth 4, N. J.

FRONTIER POWER ACTS TO HALT MUNICIPAL PLANT

The Frontier Power Co., K. W. Kissick president, has taken legal action to halt construction of a municipal electric power plant by the city of Trinidad, Colo.

This move followed an election last Jan. 6 when voters approved the public ownership proposal by a 10-to-1 majority. Trinidad voters later authorized a $1,800,000 revenue bond issue for construction and equipment.

Frontier Power, in a district court action, alleged the city's plan "will entail great and irreparable damage and injury" to the company; that the city interfered with the election through the medium of letters of instruction sent to election officials; that voters were "confused and misled at the time they went to the polls." On a basis of these considerations, the privately owned concern asked an injunction to forestall execution of the municipal power project.

On May 13, District Judge David M. Ralston took the case under advisement.

B. C. Legislation to Provide Certification

Under amendments to the Electrical Energy Inspection Act, legislation has been established to provide for the certification of contractors handling electrical installations and repairs in British Columbia.

The amendment divides the province into various territories and certificates of competency may be required in any of the named territories. Such certificates will not be needed in unorganized territory.

Legislation of this type, which would pave the way for the licensing of electrical contractors following an examination, has been sought by the Vancouver Electrical Assn. and by other electrical contractors' groups in British Columbia for many years.

● A $20,000,000 development program spread over the next five years was announced by Henry B. Sargent, president of the Central Arizona Light and Power Co., at a meeting of stockholders in Phoenix. To be used for electrical generation and transmission and expansion of the system's natural gas lines, the projected expansion probably will require additional financing, Sargent told the meeting, adding that market conditions at the time the new money is needed will be a governing factor in determining the financing method.

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SORGEL AIR-COOLED TRANSFORMERS

Complete Line of DRY-TYPE Transformers

From

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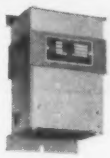
1000 Kva

Single phase and 3-phase



¼ KVA Single Phase 460/230 to 115 Volt

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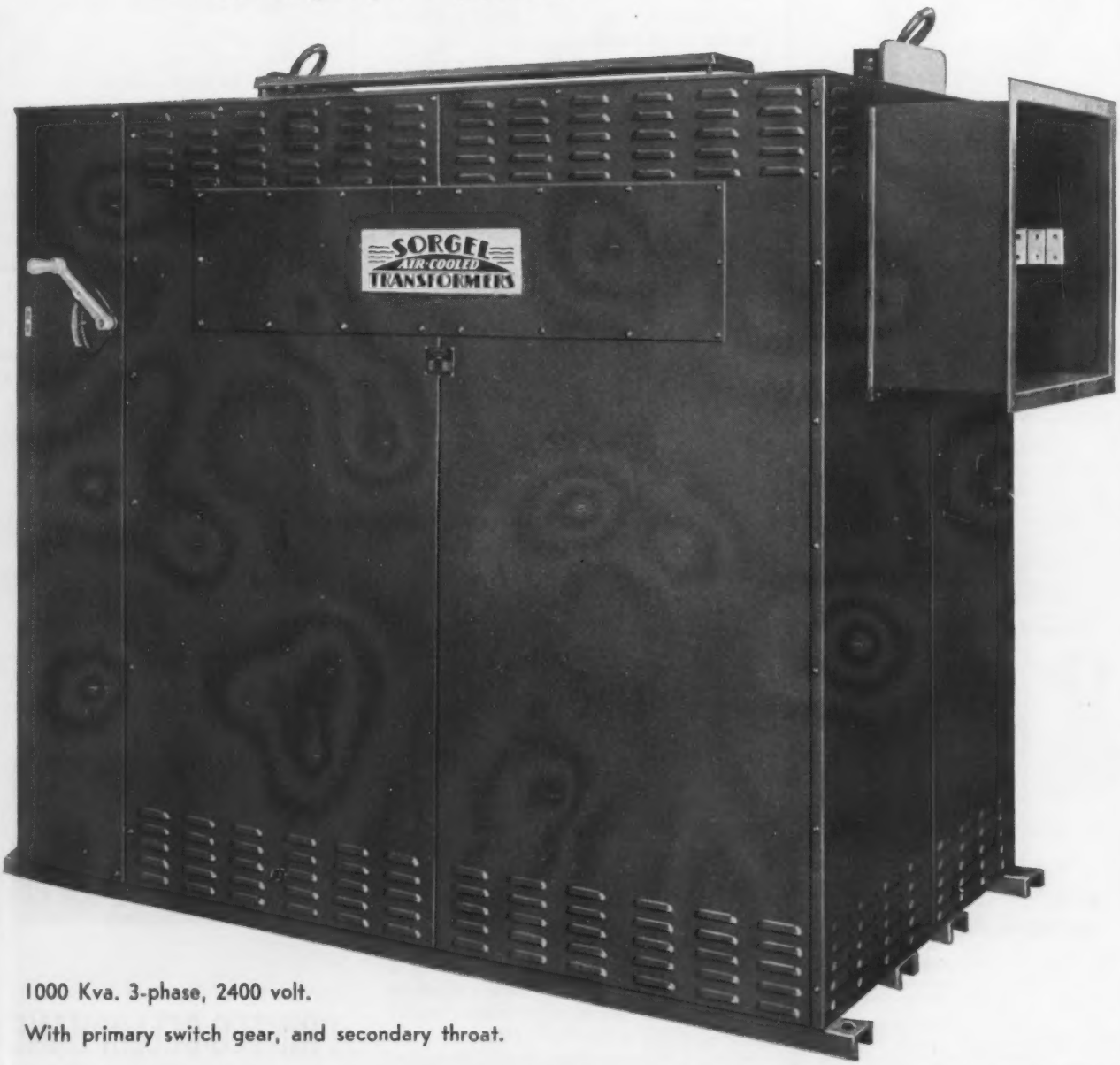
All voltages up to 15,000 volts



1000 Kva. 3-phase, 2400 volt.

With primary switch gear, and secondary throat.

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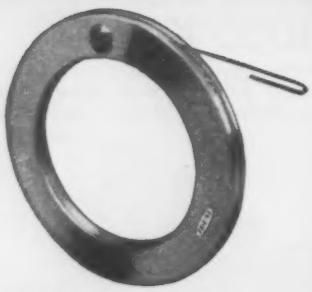
Pioneers in the development and manufacturing of Air-Cooled transformers.

Speed Wiring-Save Tape
with IDEAL
FISH TAPE, REEL and PULLER



3 TOOLS IN ONE

This handy device belongs in every wireman's kit. Gives complete control of Fish Tape . . . keeps it reeled up . . . prevents springing and breaking . . . helps workman avoid "live" parts. Makes it easy to pull tape through conduit quickly without kinks or bends. No slipping. Gives a *big* grip. Tape is easy to reel in or pay out. 7 sizes. Ideal Fish Tapes are made of highest grade tempered spring steel wire—non-curling.

IDEAL VOLTAGE TESTER

Not an ordinary "glo" type—actually indicates nominal line voltage on easy-to-read scale, calibrated from 110 to 600 volts. DOUBLE PROTECTION — Combines solenoid indicator *and* neon test lamp. Tests AC or DC circuits. Complete with carrying case.

"E-Z" HAND TYPE STRIPPER and CUTTER

For solid or stranded wire. Always ready—no cocking. *Triple action* . . . clamps wire, cuts insulation . . . strips—all in one operation. Eliminates wire waste. Made in two models. "Automatic" has lever to stop return of arms till stripped wire is removed.

"SAFE-T-GRIP" FUSE PULLER

No Slip! Formed to fit fingers; assures positive, full grip. Safe, handy, inexpensive. Eliminates danger, prevents bending of fuse clips. Three sizes. Many uses.—IDEAL INDUSTRIES, Inc., Sycamore, Ill.

IDEAL
Distributed Through
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B. C. AMENDS LABOR CODE, OUTLAWS COERCION

Anti-strike provisions of British Columbia's labor code were tightened and new provisions to outlaw coercion of employees by either employer or labor groups were made by a recent session of the B. C. legislature.

However, formal demands by industry for an anti-Communist clause requiring affidavits of union officials were not approved.

Amendments to the act followed appointment of a new five-man Labor Relations Board, provided for in the original act last year, but not implemented until January of this year. The new board is given wider powers in the amended act, with full authority over conciliation, arbitration, supervision of strike votes and enforcement measures.

Chief features of the strike curb include:

1. The board will have power to issue "cease and desist" orders if either an employer or a labor organization violates terms of the act during a dispute.

2. In addition to the present provision for a government-supervised secret prestrike ballot of employers and employees, is a provision that the board may order a secret ballot of employers and/or employees on any reasonable offer that may be made by either side during a strike.

3. The board may cancel a union's bargaining authority if an illegal strike is called.

Penalties for illegal lockouts or strikes include a fine of $150 for each day of the lockout or strike for the employer or union and a fine of $50 a day for the employer's representative or union official who orders it.

● IBEW has formed a committee to prepare a program for presentation at the Tenth Annual Western Safety Conference in Hollywood, June 16-18. It is planned to emphasize the benefit of safety programs in the light of employee-management relations from the viewpoint of the individual worker and his group representative in the form of the union. O. G. Harbak, international vice-president of IBEW's ninth district, heads the union committee.

● Some 8,000 workers in unions affiliated with the AFL Seattle Building & Construction Trades Council waived an hourly wage increase provided under a cost-of-living escalator clause in their contract. The increase would have become effective July 1. All unions in the building trades except teamsters, plumbers, pipefitters and operating engineers, whose unions operate under separate contracts, are affected.

Sales and Application ENGINEER

Excellent opportunity with nationwide metal producer available for qualified applicant. Engineering graduate preferred with experience in transmission and distribution line construction and engineering, age 27-35. Thorough plant and headquarters training contemplated before assignment to district office. Please submit resume including personal data, education and experience to

Box 244, Electrical West
68 Post St., San Francisco 4, Calif.

200 KVA TRANSFORMER
NEW—NEVER USED

Single phase, oil immersed, self cooled, outdoor type. Rating: General Electric, Type HS—60 cycles—200 KVA—(55C) high voltage — 4400/7620Y volts — low voltage—240/480 volts.

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Manufacturers' publications are a quick, efficient way for you to keep posted on developments in the electrical field. American industry is offering a remarkable service—free. ELECTRICAL WEST makes it easy for you to secure this service. Check and mail coupon on p. 76. That's all you have to do to bring this information to you.

MOTORS, GENERATORS, TRANSFORMERS

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Colorful - Self Adhesive - Cellophane, processed in Rolls. Easy to buy - Easy to apply - used for Packaging - Point of Sale advertising - Parts marking and Aircraft Wire terminal identification.

TOPFLIGHT TAPE - YORK, PA.

NEWS ABOUT PEOPLE

● C. D. HEPLER, formerly vice-president in charge of marketing for the Trumbull Electric Mfg. Co., has been named general manager of the construction materials department of General Electric Co. established May 1. Hepler joined the Trumbull organization in 1929 as manager of its Seattle plant. In 1933 he became vice-president and general manager of the Trumbull Pacific Division, and was made president of the division in 1945. A year later he was transferred to the Plainville, Conn., plant to assume the position of vice-president in charge of manufacturing of all Trumbull plants.

● JIM SHIRREFFS, president of S & M Lamp Co., Los Angeles, made known three new appointments following the announcement of the retirement of his brother, William G. Shirreffs, as vice-president of the company. WILLIAM SHALDA will become vice-president; JIM SHIRREFFS JR. will take over the position of plant manager in charge of the firm's three Los Angeles plants; FRED MACFEE will become sales manager.

George Kimball and Mrs. Kimball cut a party cake when the Department of Industrial Safety, for which he was supervising electrical engineer for so many years, gave him send-off on his retirement and before a long trip East

...there IS something NEW under the Sun!

Underwriters' Laboratories Approved as Raintight

FAM

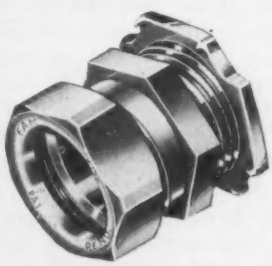
EMT Thin Wall Conduit Fittings

FAM Coupling (Cutaway View)

ALL STEEL
CADMIUM PLATED

■ Eliminate your fitting problems from the start. The FAM coupling has only three parts—and no rings to cock or lose. It's precision machined to bite deeply into the conduit surface for sure, positive ground, and a raintight seal. And better yet, FAM couplings can be used over and over again.

FAM Connector



FAM Features

1. Simple, fast installation
2. No rings to cock or lose
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Buy FAM couplings and connectors—they will merit your continued confidence

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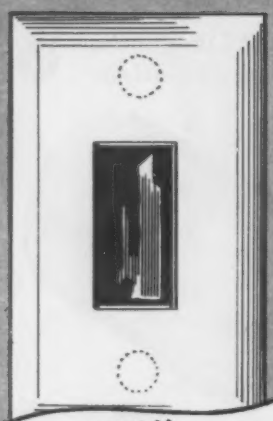
NO TWIST-
NO PUSH-
NO PULL-



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TOUCH-PLATE
LOW VOLTAGE
LIGHT CONTROL SYSTEM

At Last A TRULY MODERN SWITCH

Touch it and the lights go on... touch it again and they're off! No more conduits to light switches... multiple controls at negligible cost . . . new streamlined beauty and absolute safety . . . this is the revolutionary new Touch-Plate System for residential lighting control. If you're looking for the newest and the best, let us tell you the whole story . . . just drop us a card.

Approved by the Underwriters' Laboratories

THE RELAY DOES THE WORK!

PACIFIC ELECTRO SALES

Seattle • Portland • San Francisco
Salt Lake City • Los Angeles

Pacific Power & Light Co.'s Ariel plant was renamed the Merwin Hydroelectric Project, in tribute to L. T. Merwin, on May 1. The picture was taken during the ceremonies and shows Merwin (left) and Paul B. McKee, president of PP&L, at the microphone. The new name plate reads, "Merwin Hydroelectric Project, named in honor of L. T. Merwin, power pioneer"

● ROBERT E. PIERCE, formerly with Utah Power & Light Co., has been appointed consulting electrical engineer for Ebasco Service Inc., New York. In 1919 Pierce was employed by the Utah Power & Light Co. and assigned to the operating department. During the eight years following he operated hydro and steam plants, inspected, tested and maintained hydro and steam equipment; and also served as general maintenance engineer. In 1927 he was transferred to the engineering department of Electric Bond & Share Co. as electrical engineer.

● SAMUEL B. MORRIS, general manager and chief engineer of the Los Angeles Department of Water & Power, was elected vice-president of the American Public Power Assn. at its recent fifth annual convention in Colorado Springs. Major Thomas Allen of Memphis was made president. The paper on federal financing of water power projests which Morris presented at the convention is printed in part on page 86.

● NORMAN A. STOLL, chief of the legislative section and assistant solicitor of the Department of Commerce, Washington, D. C., has been appointed general counsel for the Bonneville Power Administration. He replaces ROBERT R. WILLARD, who was transferred to the atomic energy commission in October, 1947. VERNON J. VERON and JOHN L. BISHOP, both Portland attorneys, were added to the legal staff of the Bonneville Power Administration.

● JOHN E. SHEEHAN of Atlanta, Ga., was appointed principal engineer and assistant general manager of the Glendale, Calif., Public Service Department last month by the Glendale city council. Sheehan is a graduate of the University of Colorado and Stanford University, holding degrees in electrical engineering and law.

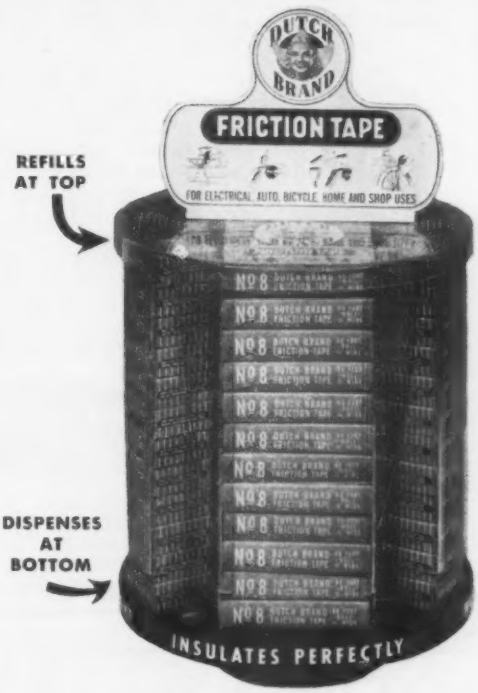
● LESTER E. WOLDIT is the newly appointed city electrician of Sacramento, Calif., replacing the late Clifford Prud'homme. For the past five months Woldit has served as acting head of the electrical division.

● W. H. DENNLER, formerly assistant manager of appliance sales for the Pacific district of General Electric, has been appointed assistant manager of the General Electric vacuum cleaner division.

● HARRY O. SHOPP has been named chief electrical inspector for San Diego County. He has been with the city of San Diego as an electrical inspector since 1936.

Seeing is Selling!

Introducing the New DUTCH BRAND FRICTION TAPE DISPENSER



Illustrated is the SENIOR Friction Tape Dispenser, which holds all four sizes of tape.

It's styled for results! This glistening, streamlined, clear plastic dispenser displays fully the attractive new package of DUTCH BRAND Friction Tape. It sells effectively every minute of the day by constantly reminding the user of his need for tape.

This new DUTCH BRAND Friction Tape Dispenser is ruggedly constructed of a special high-strength plastic. Its striking, clear plastic beauty creates instant attention. The graceful sign at the top illustrates tape uses for electricians, shopmen, motorists and home owners. The unit revolves freely on its steady circular base and permits easy removal or refill of tape cartons.

By forcefully bringing a timely reminder to innumerable tape users, the beautiful DUTCH BRAND Dispenser *doubles* and *triples* tape sales *without an extra ounce of dealer effort.* It keeps potential tape sales from going out the door and paves the way to steady, even more profitable, refill business.

There are two sizes of the beautiful DUTCH BRAND Friction Tape Dispenser, each designed for a specific purpose. The SENIOR for stores selling all four sizes of tape (Nos. 1, 2, 4 and 8) and the JUNIOR for stores selling the popular No. 1 and No. 2 sizes only.

DUTCH BRAND

VAN CLEEF BROS. INC.

MANUFACTURERS . . . RUBBER PRODUCTS . . . EST. 1910

CHICAGO 19, U. S. A.

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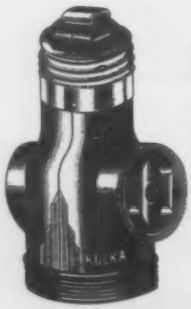
a great name in electrical wiring devices

For more than a quarter century the name of KULKA on any product has been your assurance of the newest in design . . . quality in construction . . . and priced right.



CURRENT TAP in Bakelite and Urea Plastics No. 204. Heavy walled brown Bakelite and of ivory Urea (No. 204 I) . . . with shade-holder ledge. Listed by UL.

MOLDED TWIN-LITE SOCKET in Bakelite and Urea Plastics No. 205-660 W.—250 K. Sturdily made of brown Bakelite and of ivory Urea plastics (No. 205 I). Listed by UL.

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Los Angeles: RELIANCE SALES CO., 440 So. Alameda
San Francisco: JAMES MUNDSTOCK, 320 Market St., Rm. 312
Portland, Ore.: PETE BACH ELECTRIC, 1233 N.W. 12 Ave.
Denver, Colo.: McDONALD & McDONALD, 1362 Clermont St.
Phoenix, Ariz.: H. GEORGE SHEFLER, P.O. Box 1587

H. H. Van Luven

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Manufacturers' Representative

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Hospital Signal Systems — Annunciators — Intercommunication equipment, etc.

DONGAN ELECTRIC MANUFACTURING CO., Inc.
Neon—Signal—Control and Power Transformers.

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Lead—Braid Covered Cables and Wires—Tinsel and Copper Cordage—Special Cables

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TRICO FUSE MFG. CO.
Fuses, Oilers, Clip Locks and Fuse Pullers

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Bakelite Controlead Terminal Blocks

Specialized
LIGHTING

ARCHITECTURAL
—For Modern Store Design
- Recessed Lens "Sightlites"
- Louvred Downlights
- Adjustable "Accentlites"
- Pin-hole "Highlites"
- Adjustable Louvred "Accentlites"
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THEATRICAL
—For Flexibility and Control
- "Theatrelites"—Stage Spotlights
- "Patternlites"—Proscenium Spotlights
- Borderlights
- Disappearing Footlights
- Floodlights
- Dimmer Control Boards

PHOTOGRAPHIC
—For Accenting and Flooding
- Soft-edge Fresnel Lens Spotlights
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Immediate Delivery on All Units

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ASSOCIATED LIGHTING SERVICE

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San Francisco

Butler

● JAMES R. BUTLER has been appointed Western regional manager of sales promotion for Rheem Mfg. Co. with headquarters in San Francisco. Prior to joining Rheem, Butler was factory representative for Westinghouse Electric Corp.

● HARRY C. GUNETTI has announced completion of his temporary assignment as general manager for the Westinghouse Electric Corp.'s Sunnyvale Works. He will return soon to the Joshua Hendy Corp. as assistant to the president. He had served as general manager of the Sunnyvale Works since its acquisition by Westinghouse in March, 1947.

● AB MARTIN is the new assistant manager at the Oakland Works of the General Electric Co.'s apparatus department. He has been with the company since 1929, serving recently as assistant to the manager of employee and community relations in the manufacturing division of the G-E apparatus department in Schenectady N. Y.

● COLUMBIA STEEL Corp, San Francisco, has appointed W. M. JARRARD as product manager in its distribution unit of the general sales department. He will be responsible for wire products, manufacturers products, electrical products, wire rope and construction materials.

● DON HANSON, formerly with McGraw-Hill as publisher's representative, has joined the Petroleum Publishing Co. of Tulsa, Okla., as West Coast representative for the Oil and Gas Journal.

● WILBER C. SNOW, 62, assistant superintendent of Seattle City, and an employee of the municipal utility since 1912, died in Seattle on May 20. He was an industrial sales engineer for Seattle City Light before being appointed assistant superintendent.

NOTES ON THE TRADE

"Power line on wheels" of the Westinghouse Electric Co., which has been touring the west. Equipment duplicating operations of a distribution line serving a 35-mile radius is shown operating under normal and abnormal conditions, climaxed by simulated lightning strikes of 100,000 volts

● M. L. (Bob) FOWLER, formerly Los Angeles manager of Benjamin Electric Mfg. Co., and at one time manufacturers agent for Triangle Conduit Co., has joined the Ernest F. Hauck Co., manufacturers agents. The firm is now known as Hauck and Fowler and will maintain offices at the same address at 324 5th St., San Francisco.

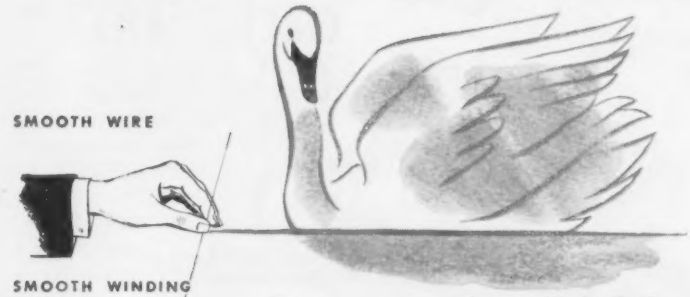
● CALIFORNIA ELECTRIC WORKS, San Diego, has been named dealer for the Allis-Chalmers line of pumps, motors, controls, circuit breakers, transformers, and Texrope V-belt products, according to an announcement by the company.

● NATIONAL ELECTRIC PRODUCTS Corp. has moved its Los Angeles office to its new California plant at 2750 W. Lomita Blvd., Torrance, Calif.

● KROWS ELECTRIC CO., Seattle, has been purchased by Oscar J. Olson, formerly assistant superintendent of maintenance for the Boeing Airplane Co.

● NEW ADDRESS of the Western publicity division of Westinghouse Electric Corp. is 410 Bush St., San Francisco 8.

Smooth



From every angle you'll find Essex Extra Test Magnet Wire a smooth product to use in your winding department. In the battle for profitable production it minimizes time lost because of hard and springy wire . . . tacky insulation film . . . poor size uniformity from spool-to-spool . . . and frequent tension adjustments. The chances are, Essex Extra Test Magnet Wire can prove its superiority for you.

ESSEX WIRE CORP.
FORT WAYNE 6, INDIANA

Plants: Anaheim, Calif.; Detroit, Mich.; Fort Wayne, Ind. Warehouses* and Sales Offices: *Atlanta, Ga.; *Boston, Mass.; *Chicago, Illinois; Cleveland, Ohio; Dallas, Texas; Dayton, Ohio; *Detroit, Mich.; Kansas City, Mo.; Los Angeles, Calif.; Milwaukee, Wis.; *Newark, N.J.; Philadelphia, Pa.; *Portland, Oreg.; St. Louis, Missouri; *San Diego, Calif.; San Francisco, California

WIRE SX PRODUCTS

Use More DROP FORGED Pole Line Hardware And Obtain ★

1 Plus Strength in Lighter Sectional Thicknesses.
2 Uniform Physical Structure, Size and Shape.
3 Freedom from Concealed Defects.
4 Extra Margin of Safety.

Forgings offer many direct and indirect economies. Consult makers of drop forged pole line hardware.

DROP FORGING ASSOCIATION
605 HANNA BUILDING • CLEVELAND, OHIO

Practical tools for Practical men!

POWERS CIRCUIT ANALYZER

Take the guesswork out of your work. Use a POWERS CIRCUIT ANALYZER. Tells you what the circuit is, Star or Delta, whether AC. or DC., whether it is 110, 220, 440, or 550. POWERS CIRCUIT ANALYZER has a wider range than any other voltage tester.

List Price with Leather Case, $24.50
without Case $14.40

POWERS VOLTESTER

A practical tool for ordinary voltage testing. Equipped with a six watt Mazda Lamp that tells you at a glance, by its own brilliancy what voltage you are on.

List Price without Case $5.20
With Leather Case.....$6.60

POWERS PRODUCTS ARE SOLD ONLY THROUGH DISTRIBUTORS

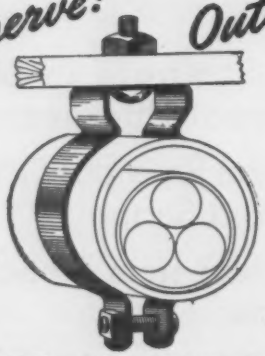
If your dealer does not have these products write to

POWERS MANUFACTURING COMPANY
1527 FOLSOM STREET, SAN FRANCISCO, CALIF.

MINERALLAC

Steel HANGERS, CLIPS, STRAPS

Outserve! Outlast!



Minerallac Cable, Conduit and Messenger Hangers are STEEL. Easier, quicker to install; permit speedy, compact wiring; economical. Also in Everdur . . . Porcelain Insulating Bushings available.

• • •

Jiffy STEEL Clips (Pipe-clamp) require only one screw, nail or bolt; rib-strengthened; for hanging pipe, conduit, BX cable, mounting coils, etc. Millions in use.

• • •

Steel Straps for Messenger-cable services on outlet boxes; may be used in conjunction with hangers.

• • •

Order from your Electrical Wholesaler. Send for literature.

MINERALLAC ELECTRIC COMPANY
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It's a Fact!
ILSCO LUGS
ARE
10% to 20% COOLER
than the heavy cast lugs you now use.

Prove it to yourself—
WRITE FOR SAMPLES
and the Ilsco 54-page illustrated catalog.

WESTERN REPRESENTATIVES
Electrical Specialty Co.
Seattle—San Francisco
Strieby & Barton, Ltd.
Los Angeles

ILSCO COPPER TUBE & PRODUCTS, Inc.
CINCINNATI, OHIO

Berg

● EFFECTIVE May 1 Emil Berg was appointed general sales manager for Afton-Lemp Electric Co. of Boise, Idaho. The company distributes Speed Queen washers, Electromaster ranges, Servel refrigerators, and a line of table appliances.

● J. H. GANZENHUBER, manager broadcast sales, Western Electric Radio Division, and J. W. LAMARQUE, manager radio sales, Graybar Electric Co., came from New York to attend the National Association of Broadcasters Convention in Los Angeles, May 17-21. Enroute to the West Coast, they made stops at New Orleans, Dallas, Tucson, Phoenix, and San Francisco, visiting local Graybar houses and radio broadcast stations. H. D. Wilson, manager electronic product sales, Western Electric Radio Division, also attended the convention and was available at the Western Electric-Bell Laboratories-Graybar booth for discussion of the electric components on display with visiting engineers.

● DISCUSSIONS on new lighting developments were conducted by F. I. Wilson, sales manager of the Wakefield Brass Co., Vermillion, Ohio, at the Palace Hotel, San Francisco, April 27-29. Wilson met with small groups of utility men, engineers, contractors, and distributors to introduce new Wakefield lines. He has been on an extended tour of the Western States, including Los Angeles, San Francisco, Portland and Seattle. The San Francisco meeting was sponsored by C. T. Bakeman, manufacturers representatives in San Francisco.

● WILSON DAVIDSON, formerly assistant to the superintendent of the General Electric Apparatus Department Service Shop in Los Angeles, was recently appointed superintendent of the shop at 6900 Stanford Ave.

GOING YOUR WAY...

Pedigree Varnishes

Your particular requirements determine the type of Pedigree Insulating Varnish we supply you. Thousands of different formulations for every conceivable electrical need are at your disposal ...so just tell us your problem and we'll tell you which varnish to use. Pedigree Varnishes are guaranteed to satisfy YOU . . . not the man next door, whose requirements may be entirely different.

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PROFILES

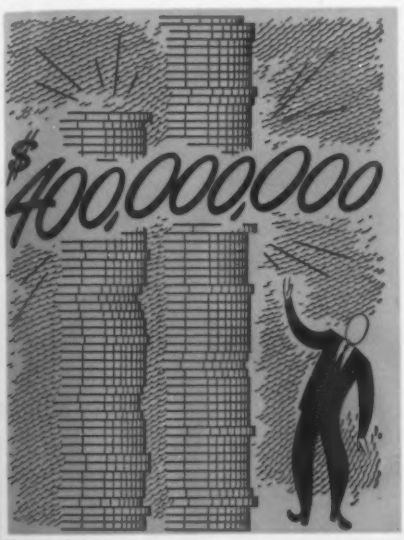
Richard McKay, assistant general manager of Washington Water Power Co., elected AIEE vice-president District 9, including 5 Northwest states. He's also general chairman for AIEE's Pacific Coast convention at Spokane in August

So big was Pittsburgh Reflector Co.'s spectacular Permaflector display that California Electric Supply Co., ceiling could not take it. Therefore Fred Nicholas Co., manufacturers' agent, had it on display. Pictured are: B. D. Levaur, vice-president, Pittsburgh Reflector Co., Sol Cohn, Calif. Electric Supply, Fred Nicholas, Lou McDonnell, Calif. Electric Supply, Ed Schaefer, dealer

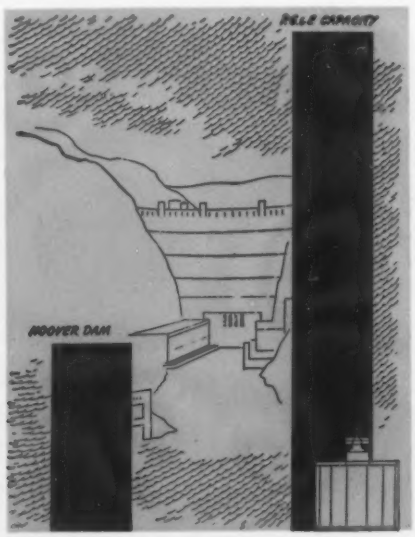
"Our Job Customers" was Ray Turnbull's pertinent topic in telling the Electric Club of San Francisco what the industry's people mean to the business saleswise. George Tenney (left) was chairman; Art Bragg is S. F. Electric Club president

America's biggest power-building program

In three and a half short years...between now and the end of 1951...P. G. and E. will add nearly two million horsepower in generating capacity. To help you understand how big this program really is... here are some comparisons.



It's the biggest program of any electrical utility in America today...costing more than $400,000,000. It is now proceeding at more than $10,000,000 a month.



Added to previous totals, the new power will give P. G. and E. a generating capacity about three times that of Hoover Dam.

Or 8 times greater than Shasta Dam. This program, now in its third year, is going full speed ahead!

Here's a schedule of major new plants and completion dates which will be met unless there are further unforeseen delays.

PLANT	CAPACITY	COMPLETION DATE
Kern Steam—First Unit	101,000 horsepower	Spring 1948
Electra Hydro	133,000 "	Summer 1948
Station "P" Steam	298,000 "	Winter 1948
West Point Hydro	21,000 "	Winter 1948
Colgate Hydro	40,000 "	Summer 1949
Cresta Hydro	101,000 "	Winter 1949
Kern Steam—Second Unit	134,000 "	Spring 1950
Rock Creek Hydro	169,000 "	Summer 1950
One Steam Unit	150,000 "	Summer 1950
Five Steam Units	150,000 " each	Year 1951

Work never stops on our power-building program

P·G·and E· PACIFIC GAS AND ELECTRIC COMPANY

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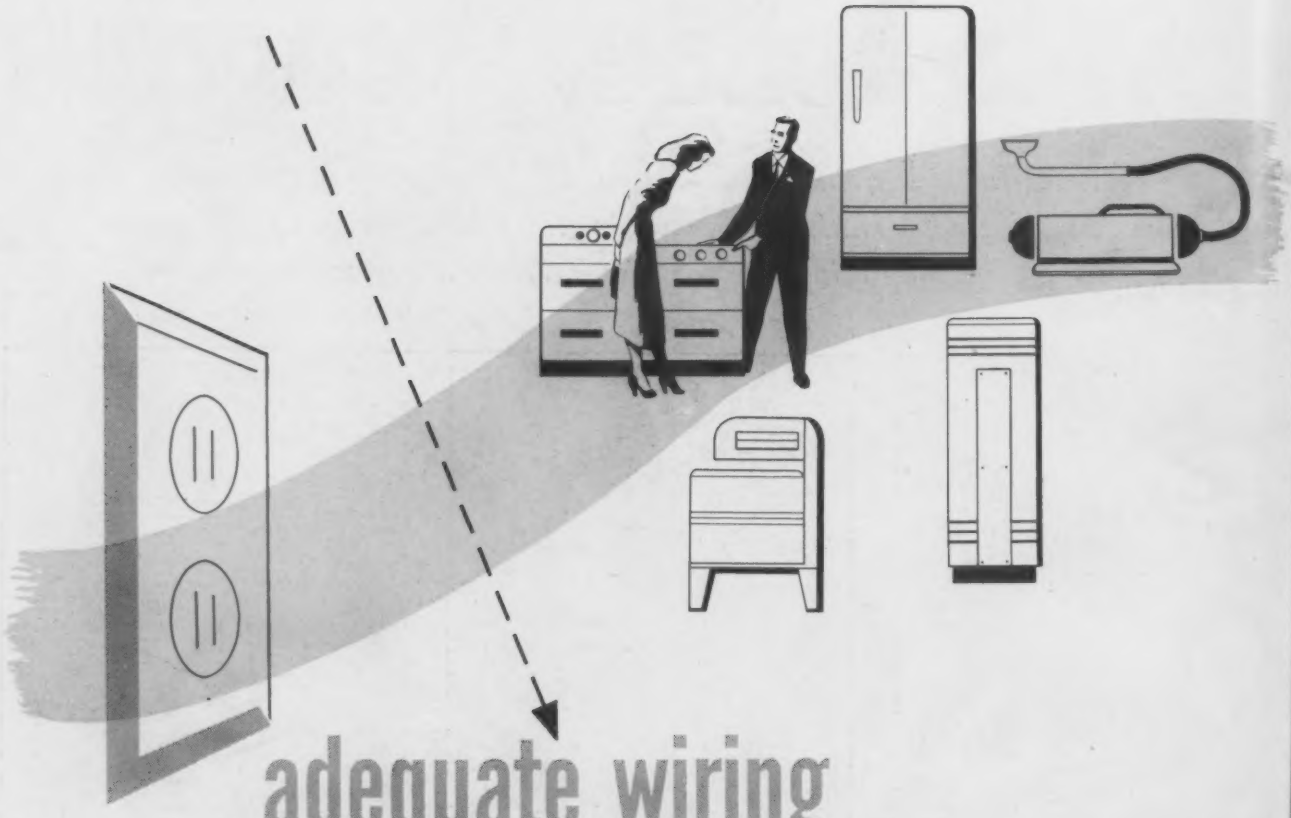

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gives the go ahead $$$$$$$$$$ *to appliance sales*

It is easier going for appliance dealers where homes are equipped with Adequate Wiring. They are your best bet for consistent sales and increased volume.

Adequate Wiring helps you to prove that electrical living is better living. It assures efficient performance from appliances now in use — and it paves the way for further sales with facilities for added service and simple, economical installation.

Every homeowner who fully enjoys the comfort and convenience of electrical living is a good prospect. Adequate Wiring widens your market, makes selling easier, gives you the "Go Ahead" and a smooth surface of satisfaction to go on!

PACIFIC COAST ELECTRICAL ASSOCIATION

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